

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
REQUEST FOR FILING NATIONAL PHASE OF
PCT APPLICATION UNDER 35 U.S.C. 371 AND 37 CFR 1.494 OR 1.495

To: Hon. Commissioner of Patents
Washington, D.C. 20231

**

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)

Atty Dkt: 46 /162
M# /Client Ref.

From: Manelli Dension & Selter: Date: December 19, 2001

This is a **REQUEST** for **FILING** a PCT/USA National Phase Application based on:

1. International Application	2. International Filing Date	3. Earliest Priority Date Claimed
<u>PCT/JP00/04444</u> <u>↑ country code</u>	04 July 2000 Day MONTH Year	05 July 1999 Day MONTH Year (use item 2 if no earlier priority)

Measured from the earliest priority date in item 3, this PCT/USA National Phase Application Request is being filed within:

- (a) 20 months from above item 3 date (b) 30 months from above item 3 date,
 (c) Therefore, the due date (unextendable) is 05 January 2002

Title of Invention: PHTHALAMIDE DERIVATIVES, INTERMEDIATES IN THE PRODUCTION THEREOF, AND AGRICULTURAL/HORTICULTURAL INSECTICIDES AND METHOD FOR USING THE SAME

Inventor(s) Kouzou Machiya, Kazuyoshi Endoh, Takashi Furuya, Hayami Nakao, Makoto Gotoh, Eiji Kohno, Masanori Tohnishi, Kazuyuki Sakata, Masayuki Morimoto and Akira Seo

Applicant herewith submits the following under 35 U.S.C. 371 to effect filing:

7. Please immediately start national examination procedures (35 U.S.C. 371 (f)).
8. A copy of the International Application as filed (35 U.S.C. 371(c)(2)) is transmitted herewith (file if in English but, if in foreign language, file only if not transmitted to PTO by the International Bureau) including:
 - a. Request;
 - b. Abstract;
 - c. pgs. Spec. and Claims;
 - d. sheet(s) Drawing which are informal formal of size A4 11"
9. A copy of the International Application has been transmitted by the International Bureau.
10. A translation of the International Application into English (35 U.S.C. 371(c)(2))
 - a. is transmitted herewith including: (1) Request; (2) Abstract;
 (3) 204 pgs. Spec. and Claims;
 (4) 0 sheet(s) Drawing which are:
 informal formal of size A4 11"
 - b. is not required, as the application was filed in English.
 - c. is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.
 - d. Translation verification attached (not required now).

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11. **PLEASE AMEND** the specification before its first line by inserting as a separate paragraph:
 a. –This application is the national phase of international application PCT/JP00/04444 filed 04 July 2000, which designated the U.S.–
 b. –This application also claims the benefit of U.S. Provisional Application No. 60/_____, filed _____.–
12. Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., before 18th month from first priority date above in item 3, are transmitted herewith (file only if in English) including:
13. PCT Article 19 claim amendments (if any) have been transmitted by the International Bureau
14. Translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., of claim amendments made before 18th month, is attached (required by 20th month from the date in item 3 if box 4(a) above is X'd, or 30th month if box 4(b) is X'd, or else amendments will be considered canceled).
15. A declaration of the inventor (35 U.S.C. 371(c)(4))
 a. is submitted herewith Original Facsimile/Copy
 b. is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.
16. An International Search Report (ISR):
 a. Was prepared by European Patent Office Japanese Patent Office Other
 b. has been transmitted by the International Bureau to PTO.
 c. copy herewith (4 pg(s).) plus Annex of family members (____ pg(s).)
17. International Preliminary Examination Report (IPER):
 a. has been transmitted (If this letter is filed after 28 months from date in item 3) in English by the International Bureau with Annexes (if any) in original language.
 b. copy herewith in English.
 c.1 IPER Annex(es) in original language ("Annexes" are amendments made to claims/spec/drawings during Examination) including attached amended:
 c.2 Specification/claim pages #____ claims #1 and 4
 Dwg Sheets #____
 d. Translation of Annex(es) to IPER (required by 30th month due date, or else annexed amendments will be considered canceled).
18. Information Disclosure Statement including:
 a. Attached Form PTO-1449 listing documents
 b. Attached copies of documents listed on Form PTO-1449
 c. A concise explanation of relevance of ISR references is given in the ISR.
19. Assignment document and Cover Sheet for recording are attached. Please mail the recorded assignment document back to the person whose signature, name and address appear at the end of this letter.
20. Copy of Power to IA agent.
21. Drawings (complete only if 8d or 10a(4) not completed): ____ sheet(s) per set: 1 set informal; Formal of size A4 11"
22. Small Entity Status is Not claimed is claimed (pre-filing confirmation required)
 22(a) _____ (No.) Small Entity Statement(s) enclosed (since 9/8/00 Small Entity Statements(s) not essential to make claim)
23. Priority is hereby claimed under 35 U.S.C. 119/365 based on the priority claim and the certified copy, both filed in the International Application during the international stage based on the filing in (country) JAPAN of:
 Application No. Filing Date Application No. Filing Date
 (1) JP 11-190446 05 July 1999 (2) JP 2000-080991 22 March 2000
 (3) _____ (4) _____
 (5) _____ (6) _____
- a. See Form PCT/IB/304 sent to US/DO with copy of priority documents. If copy has not been received, please proceed promptly to obtain same from the IB.
 b. Copy of Form PCT/IB/304 attached.

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24. Attached: 1. Form PCT/IB/308
2. Cover page of published international application WO 00/65914 (contains English Abstract)
25. **Preliminary Amendment:** ATTACHED 1. First Preliminary Amendment (enter prior to fee calculation)
2. Second Preliminary Amendment

25.5 Per Item 17.c2, cancel original pages #_____, claims #_____, Drawing Sheets #_____.

26. **Calculation of the U.S. National Fee (35 U.S.C. 371 (c)(1)) and other fees is as follows:**
Based on amended claim(s) per above item(s) 12, 14, 17, 25, 25.5 (hlite)

Total Effective Claims	8	minus 20 =	x \$18/\$9 =	\$0	966/967
Independent Claims	3	minus 3 =	x \$84/\$42 =	\$0	964/965
			add\$280/\$140	+0	968/969

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(4)): ➡ ➡ BASIC FEE REQUIRED, NOW ➡ ➡ ➡A. If country code letters in item 1 are not "US", "BR", "BB", "TT", "MX", "IL", "NZ", "IN" or "ZA"

See item 16 re:

1. Search Report was <u>not prepared by EPO or JPO</u> -----	add\$1040/\$520	960/961
2. Search Report was prepared by EPO or JPO -----	add\$890/\$445	+890.00

SKIP B, C, D AND E UNLESS country code letters in item 1 are "US", "BR", "BB", "TT", "MX", "IL", "NZ", "IN" or "ZA"

- B. If USPTO did not issue both International Search Report (ISR) and (if box 4(b) above is X'd) the International Examination Report (IPER), ----- add\$1040/\$520 +0 960/961
- (only) → C. If USPTO issued ISR but not IPER (or box 4(a) above is X'd), ----- add\$740/\$370 +0 958/959
- (these) → D. If USPTO issued IPER but IPER Sec. V boxes not all 3 YES, ----- add\$710/\$355 +0 956/957
- E. If international preliminary examination fee was paid to USPTO and Rules 492(a)(4) and 496(b) satisfied (IPER Sec. V all 3 boxes YES for all claims), ----- add \$100/\$50 +0 962/963

27. **SUBTOTAL = \$890.00**
28. If Assignment box 19 above is X'd, add Assignment Recording fee of ---\$40 +0 (581)
29. Attached is a check to cover the ----- **TOTAL FEES \$890.00**

Our Deposit Account No. 50-0687

**

Our Order No.

46 | 162

C# M#

CHARGE STATEMENT: The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 and 492 (missing or insufficient fee only) now or hereafter relative to this application and the resulting Official document under Rule 20, or credit any overpayment, to our Account/Order Nos. shown above for which purpose a duplicate copy of this sheet is attached.

This CHARGE STATEMENT does not authorize charge of the Issue fee until/unless an issue fee transmittal form is filed

Manelli Denison & Selter
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Washington, DC 20036

By Atty: Paul E. White, Jr.

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Tel: 202-261-1050

Atty/Sec: /

NOTE: File in duplicate with 2 postcard receipts (PAT-103) & attachments.

10/018464

581 Rec'd PCT 19 DEC 2001
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION of
MACHIYA, et al.

Group Art Unit: Not Assigned

Appln. No.: Not Assigned

Examiner: Not Assigned

Filed: December 19, 2001

International Appln. No. PCT/JP00/04444

Title: PHTHALAMIDE DERIVATIVES, INTERMEDIATES IN THE
PRODUCTION THEREOF, AND AGRICULTURAL/HORTICULTURAL
INSECTICIDES AND METHOD FOR USING THE SAME

* * * * *

December 19, 2001

**FIRST PRELIMINARY AMENDMENT: TO BE ENTERED PRIOR
TO CALCULATION OF FILING FEE**

Hon. Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

Please enter the following Preliminary Amendment of the subject new
application prior to calculation of the fee for filing the application.

IN THE CLAIMS:

Please amend claim 8 as follows (see the attached Appendix for the changes
made to effect the below claim):

Claim 8. (Amended) A method for using an agrohorticultural
insecticide characterized by treating an objective crop or applying to soil with an
effective quantity of an agrohorticultural insecticide according to claim 5 for the

purpose of controlling noxious organisms doing harm to useful crops.

REMARKS

This Preliminary Amendment revises the multiple dependent claims to be single dependent claims and thus reduce the filing fee for the subject application. No new matter has been added.

Entry of this amendment and favorable consideration of this application are respectfully requested.

Respectfully submitted,

MANELLI DENISON & SELTER, PLLC

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APPENDIX SHOWING REVISIONS OF CLAIMS

Proposed Amendments To Claim 8 Showing Deletions And Insertions.

Claim 8. (Amended) A method for using an agrohorticultural insecticide characterized by treating an objective crop or applying to soil with an effective quantity of an agrohorticultural insecticide according to [any one of Claims 5, 6 and 7] claim 5 for the purpose of controlling noxious organisms doing harm to useful crops.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION of
MACHIYA, et al.

Group Art Unit: Not Assigned

Appln. No.: Not Assigned

Examiner: Not Assigned

Filed: December 19, 2001

International Appln. No. PCT/JP00/04444

Title: PHTHALAMIDE DERIVATIVES, INTERMEDIATES IN THE
PRODUCTION THEREOF, AND AGRICULTURAL/HORTICULTURAL
INSECTICIDES AND METHOD FOR USING THE SAME

* * * * *

December 19, 2001

SECOND PRELIMINARY AMENDMENT:
TO BE ENTERED AFTER CALCULATION OF FILING FEE

Hon. Commissioner of Patents
and Trademarks
Washington, D.C. 20231

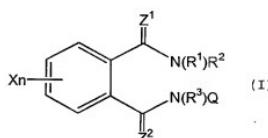
Sir:

Please enter the following Preliminary Amendment of the subject new application prior to calculation of the fee for filing the application.

IN THE CLAIMS:

Please amend claims 1 and 4 as follows (see the attached Appendix for the changes made to effect the below claims):

Claim 1. (Amended) A phthalamide derivative represented by the following general formula (I):



wherein R¹, R² and R³, which may be same or different, represent hydrogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group or -A¹-(G), (in this formula, A¹ represents C₁-C₈ alkylene group, C₃-C₆ alkenylene group or C₃-C₆ alkynylene group; G, which may be same or different, represents hydrogen atom, halogen atom, cyano group, nitro group, halo C₁-C₆ alkyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy carbonyl group, di(C₁-C₆) alkoxy phosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, di(C₁-C₆) alkoxythiophosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, diphenylphosphino group, diphenylphosphono group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (as used herein, the term "heterocyclic group" means pyridyl group, pyridine-N-oxide group, pyrimidinyl group, furyl group, tetrahydrofuryl group, thienyl group, tetrahydrothienyl group, tetrahydropyran group, oxazolyl group, isoxazolyl group, oxadiazolyl group, thiazolyl group, isothiazolyl group, thiadiazolyl group, imidazolyl group, triazolyl group or pyrazolyl group), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -Z³-R⁴ (in this formula, Z³ represents -O-, -S-, -SO-, -SO₂-, -N(R⁵)- (in this formula, R⁵ represents hydrogen atom, C₁-C₆

alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, phenyl carbonyl group, substituted phenyl carbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkoxy carbonyl group, substituted phenyl C₁-C₄ alkoxy carbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, C₁-C₆ alkylsulfonyl group or halo C₁-C₆ alkylsulfonyl group), -C(=O)- or -C(=NOR⁶)- (in this formula, R⁶ represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, phenyl C₁-C₄ alkyl group, or substituted phenyl C₁-C₄ alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group), and R⁴ represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ alkynyl group, halo C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy C₁-C₆ alkyl group, C₁-C₆ alkylthio C₁-C₆ alkyl group, formyl group, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group,

mono (C_1-C_6) alkylaminocarbonyl group, di(C_1-C_6) alkylaminocarbonyl group in which the (C_1-C_6) alkyl groups may be same or different, mono(C_1-C_6) alkylaminothiocarbonyl group, di(C_1-C_6) alkylaminothiocarbonyl group in which the (C_1-C_6) alkyl groups may be same or different, di(C_1-C_6) alkoxyphosphoryl group in which the (C_1-C_6) alkoxy groups may be same or different, di(C_1-C_6) alkoxythiophosphoryl group in which the (C_1-C_6) alkoxy groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl (C_1-C_4) alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group); and r represents an integer of 1 to 4; further, R¹ and R² may be taken conjointly to form 4- to 7-membered rings which may be intercepted by 1 to 3, same or different oxygen atom, sulfur atom or nitrogen

atom;

X, which may be same or different, represents halogen atom, cyano group, nitro group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A²-R⁷ [in this formula, A² represents -O-, -S-, -SO-, -SO₂-, -NR⁸- (in this formula R⁸ represents hydrogen atom, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, phenylcarbonyl group, substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkoxy carbonyl group or substituted phenyl C₁-C₄ alkoxy carbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-

C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group), -C(=O)-, -C=NOR⁸-(in this formula, R⁸ is as defined above), C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₂-C₆ alkenylene group, halo C₂-C₆ alkenylene group, C₂-C₆ alkynylene group or halo C₃-C₆ alkynylene group; and

(1) in cases where A² represents -O-, -S-, -SO-, -SO₂- or -NR⁸-(in this formula, R⁸ is as defined above), R⁷ represents hydrogen atom, halo C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkenyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A³-R⁹ (in this formula, A³ represents C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₃-C₆ alkenylene group, halo C₃-C₆ alkenylene group, C₃-C₆ alkynylene group or halo C₃-C₆ alkynylene group; and R⁹ represents hydrogen atom, halogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy carbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy

group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A⁴-R¹⁰ (in this formula, A⁴ represents -O-, -S-, -SO₂-, -SO₂- or -C(=O)-; and R¹⁰ represents C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group));

- (2) in cases where A² represents -C(=O)- or -C(=NOR⁶)- (in this formula, R⁶ is as defined above), R⁷ represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₂-C₆ alkenyl group, halo C₂-C₆ alkenyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, mono(C₁-C₆) alkylamino group, di(C₁-C₆) alkylamino group in which the (C₁-C₆) alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group,

halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenylamino group, substituted phenylamino group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group; and

- (3) in cases where A² represents C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₂-C₆ alkenylene group, halo C₂-C₆ alkenylene group, C₂-C₆ alkynylene group or halo C₃-C₆ alkynylene group, R⁷ represents hydrogen atom, halogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alcoxycarbonyl group, tri(C₁-C₆) alkylsilyl group in which the (C₁-C₆) alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above),

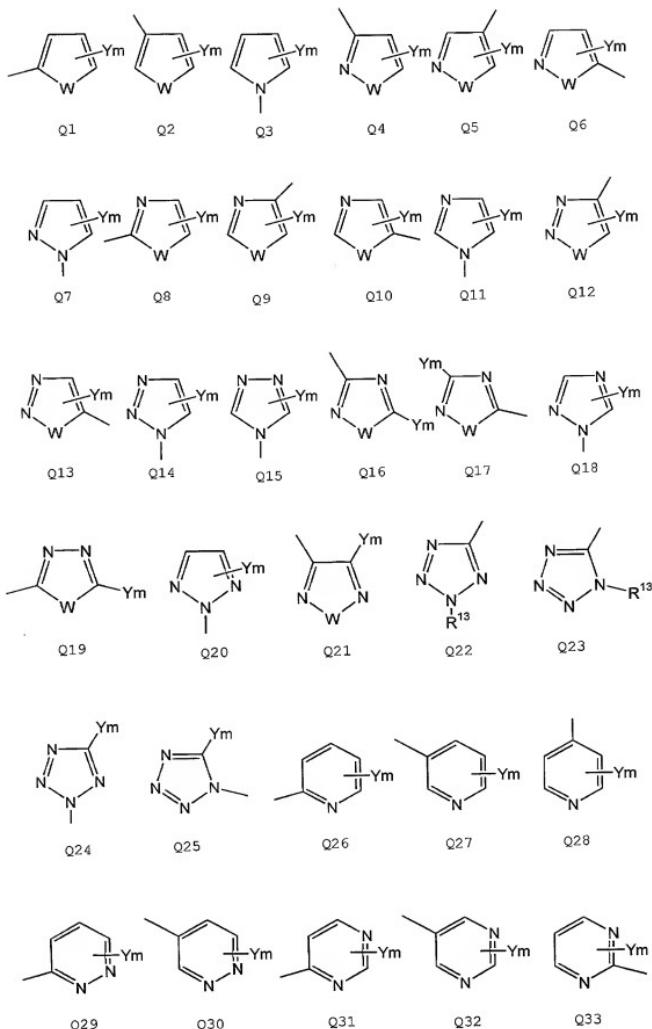
substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A⁵-R¹¹ (in this formula, A⁵ represents -O-, -S-, -SO- or -SO₂-; and R¹¹ represents C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A⁶-R¹² (in this formula, A⁶ represents C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₂-C₆ alkenylene group, halo C₂-C₆ alkenylene group, C₂-C₆ alkynylene group or halo C₃-C₆ alkynylene group; and R¹² represents hydrogen atom, halogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different

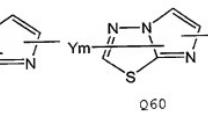
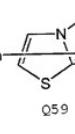
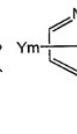
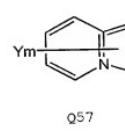
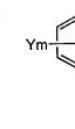
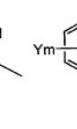
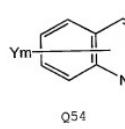
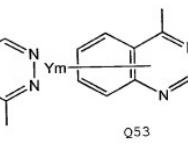
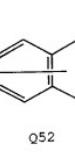
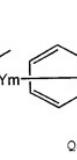
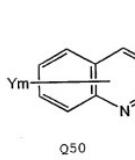
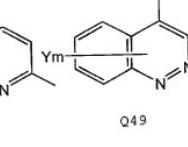
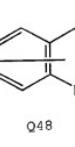
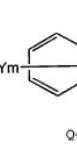
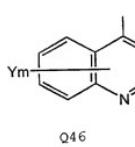
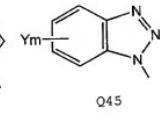
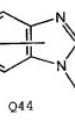
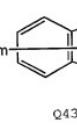
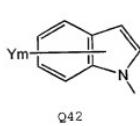
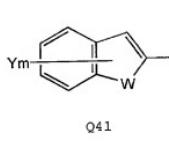
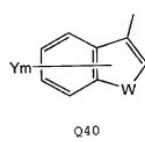
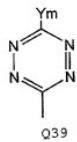
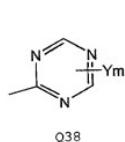
substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenoxy group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group));

n represents an integer of 0 to 4; further, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring (as used herein, the term fused ring means naphthalene, tetrahydronaphthalene, indene, indane, quinoline, quinazoline, chroman, isochroman, indole, indoline, benzodioxane, benzodioxole, benzofuran, dihydrobenzofuran, benzothiophene,

dihydrobenzothiophene, benzoxazole, benzothiazole, benzimidazole or indazole), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group;

Q represents an N-, S- or O-containing, optionally substituted, heterocyclic group or fused heterocyclic group, selected from the group consisting of the following formulas Q1 to Q60;





(in these formulas, Y, which may be same or different, represents halogen atom, cyano group, nitro group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A²-R⁷ (in this formula, A² and R⁷ are as defined above); m represents an integer of 0 to 6; R¹³ in the formula Q22 and Q23 represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ alkynyl group, halo C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy C₁-C₆ alkyl group, halo C₁-C₆ alkoxy C₁-C₆ alkyl group, C₁-C₆ alkylthio C₁-C₆ alkyl group, halo C₁-C₆ alkylthio C₁-C₆ alkyl group, C₁-C₆ alkylsulfinyl C₁-C₆ alkyl group, halo C₁-C₆ alkylsulfinyl C₁-C₆ alkyl group, C₁-C₆ alkylsulfonyl C₁-C₆ alkyl group, halo C₁-C₆ alkylsulfonyl C₁-C₆ alkyl group, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy

group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkyl group, substituted phenyl C₁-C₄ alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenylcarbonyl group, or substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group);

alternatively, Y may be taken conjointly with adjacent carbon atom on the ring to form a fused ring (the fused ring is as defined above), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined

above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group;

W represents O, S or N-R¹³ (in this formula, R¹³ is as defined above); and Z¹ and Z² represent oxygen atom or sulfur atom;

provided that (1) when X, R¹ and R³ simultaneously represent hydrogen atom, Z¹ and Z² simultaneously represent oxygen atom, Q represents Q27, and Y is a chlorine atom of 2-position, then R² is not 1,2,2-trimethylpropyl group ..

(2) when X, R¹ and R³ simultaneously represent hydrogen atom, Z¹ and Z² simultaneously represent oxygen atom, Q represents Q27 and m is 0, then R² is not 1,2,2-trimethylpropyl group, and

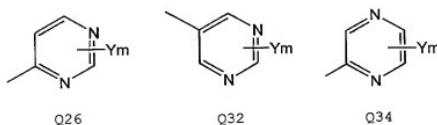
(3) when X, R¹ and R³ simultaneously represent hydrogen atom, Z¹ and Z² simultaneously represent oxygen atom, Q represents Q16 and Y represents methylthio group, then R² is not hydrogen atom and methyl group.

Claim 4. (Amended) A heterocyclic amine derivative represented by the following general formula (IV'):



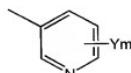
wherein:

(1) in cases where Q' represents one of Q26, Q32 and Q34,



Y, which may be same or different, represents halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkyl-sulfonyl group or halo C₁-C₆ alkylsulfonyl group, m represents an integer of 1 to 4, and at least one of Y, of which total number is m, is perfluoro C₂-C₆ alkyl group; and

(2) in a case where Q' represents Q27:



Q27

Y, which may be same or different, represents halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkyl-sulfonyl group or halo C₁-C₆ alkylsulfonyl group, m represents an integer of 1 to 4, and at least one of Y, of which total number is m, is perfluoro C₂-C₆ alkyl group, halo C₁-C₆ alkoxy group or halo C₁-C₆ alkylthio group,

provided that Y is not 2,2,2-trifluoroethoxy group.

REMARKS

This Preliminary Amendment revises claims 1 and 4 in accordance with the Amendment under PCT Article 34 that was made in the Japanese language during the international phase of the subject international application. For the Examiner's convenience, claim 1 is amended in the last three paragraphs of this claim, and claim 4 is almost completely replaced with new language.

No new matter has been added.

Entry of this amendment and favorable consideration of this application are respectfully requested.

Respectfully submitted,

MANELLINI DENISON & SELTER, PLLC

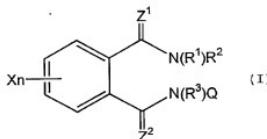
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APPENDIX SHOWING REVISIONS OF CLAIMS

Proposed Amendments To Claims 1 and 4 Showing Deletions And Insertions.

Claim 1. (Amended) A phthalamide derivative represented by the following general formula (I):



wherein R¹, R² and R³, which may be same or different, represent hydrogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group or -A¹-(G), (in this formula, A¹ represents C₁-C₆ alkylene group, C₃-C₆ alkenylene group or C₃-C₆ alkynylene group; G, which may be same or different, represents hydrogen atom, halogen atom, cyano group, nitro group, halo C₁-C₆ alkyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy carbonyl group, di(C₁-C₆) alkoxyphosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, di(C₁-C₆) alkoxythiophosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, diphenylphosphino group, diphenylphosphono group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (as used

herein, the term "heterocyclic group" means pyridyl group, pyridine-N-oxide group, pyrimidinyl group, furyl group, tetrahydrofuryl group, thienyl group, tetrahydrothienyl group, tetrahydropyranly group, oxazolyl group, isoxazolyl group, oxadiazolyl group, thiazolyl group, isothiazolyl group, thiadiazolyl group, imidazolyl group, triazolyl group or pyrazolyl group), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -Z³-R⁴ (in this formula, Z³ represents -O-, -S-, -SO-, -SO₂-, -N(R⁵)- (in this formula, R⁵ represents hydrogen atom, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, phenylcarbonyl group, substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkoxy carbonyl group, substituted phenyl C₁-C₄ alkoxy carbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, C₁-C₆ alkylsulfonyl group or halo C₁-C₆ alkylsulfonyl group), -C(=O)- or -C(=NOR⁶)- (in this formula, R⁶ represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo

C₃-C₆ alkenyl group, C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, phenyl C₁-C₄ alkyl group, or substituted phenyl C₁-C₄ alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group), and R⁴ represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ alkynyl group, halo C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy C₁-C₆ alkyl group, C₁-C₆ alkylthio C₁-C₆ alkyl group, formyl group, C₁-C₆ alkyl carbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, mono(C₁-C₆) alkylaminocarbonyl group, di(C₁-C₆) alkylaminocarbonyl group in which the (C₁-C₆) alkyl groups may be same or different, mono(C₁-C₆) alkylaminothiocarbonyl group, di(C₁-C₆) alkylaminothiocarbonyl group in which the (C₁-C₆) alkyl groups may be same or different, di(C₁-C₆) alkoxyphosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, di(C₁-C₆) alkoxythiophosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkyl group, substituted phenyl (C₁-C₄) alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group,

C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group); and r represents an integer of 1 to 4); further, R¹ and R² may be taken conjointly to form 4- to 7-membered rings which may be intercropped by 1 to 3, same or different oxygen atom, sulfur atom or nitrogen atom;

X, which may be same or different, represents halogen atom, cyano group, nitro group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A²-R⁷ [in this formula, A² represents -O-, -S-, -SO-, -SO₂-, -NR⁸- (in this formula R⁸ represents

hydrogen atom, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, phenylcarbonyl group, substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkoxy carbonyl group or substituted phenyl C₁-C₄ alkoxy carbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group), -C(=O)-, -C(=NOR⁶)-(in this formula, R⁶ is as defined above), C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₂-C₆ alkenylene group, halo C₂-C₆ alkenylene group, C₂-C₆ alkynylene group or halo C₃-C₆ alkynylene group; and

- (1) in cases where A² represents -O-, -S-, -SO-, -SO₂- or -NR⁸- (in this formula, R⁸ is as defined above), R⁷ represents hydrogen atom, halo C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkenyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group

consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A³-R⁹ (in this formula, A³ represents C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₃-C₆ alkenylene group, halo C₃-C₆ alkenylene group, C₃-C₆ alkynylene group or halo C₃-C₆ alkynylene group; and R⁹ represents hydrogen atom, halogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy carbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A⁴-R¹⁰ (in this formula, A⁴ represents -O-, -S-, -SO-, -SO₂- or -C(=O)-; and R¹⁰ represents C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆

alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group);

- (2) in cases where A² represents -C(=O)- or -C(=NOR⁶)- (in this formula, R⁶ is as defined above), R⁷ represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₂-C₆ alkenyl group, halo C₂-C₆ alkenyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, mono(C₁-C₆) alkylamino group, di(C₁-C₆) alkylamino group in which the (C₁-C₆) alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenylamino group, substituted phenylamino group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group; and
- (3) in cases where A² represents C₁-C₆ alkylene group, halo C₁-C₆

alkylene group, C₂-C₆ alkenylene group, halo C₂-C₆ alkenylene group, C₂-C₆ alkynylene group or halo C₃-C₆ alkynylene group, R⁷ represents hydrogen atom, halogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy carbonyl group, tri(C₁-C₆) alkylsilyl group in which the (C₁-C₆) alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A⁵-R¹¹ (in this formula, A⁵ represents -O-, -S-, -SO- or -SO₂-; and R¹¹ represents C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group,

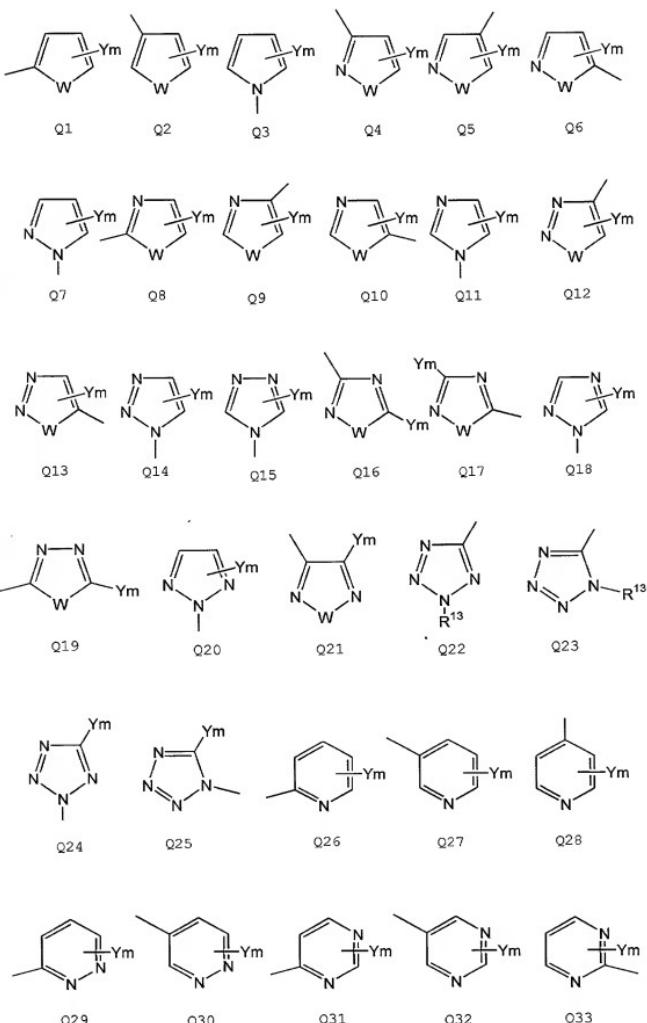
halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A⁶-R¹² (in this formula, A⁶ represents C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₂-C₆ alkenylene group, halo C₂-C₆ alkenylene group, C₂-C₆ alkynylene group or halo C₃-C₆ alkynylene group; and R¹² represents hydrogen atom, halogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenoxy group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic

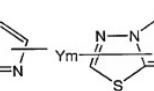
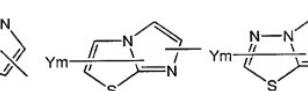
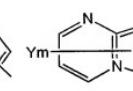
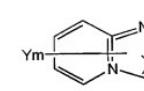
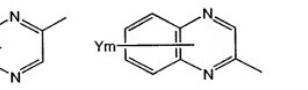
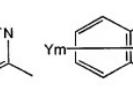
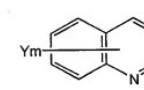
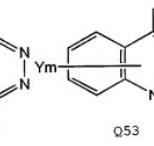
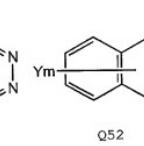
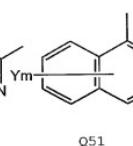
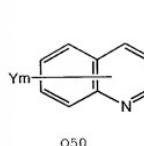
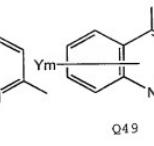
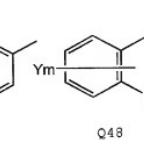
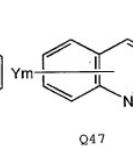
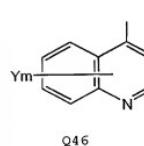
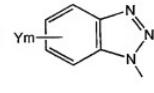
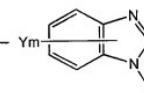
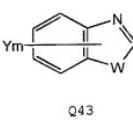
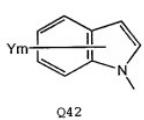
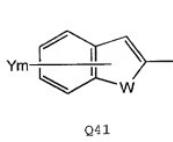
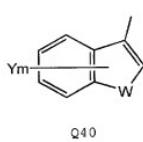
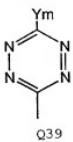
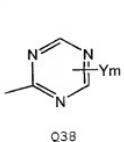
group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group));

n represents an integer of 0 to 4; further, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring (as used herein, the term fused ring means naphthalene, tetrahydronaphthalene, indene, indane, quinoline, quinazoline, chroman, isochroman, indole, indoline, benzodioxane, benzodioxole, benzofuran, dihydrobenzofuran, benzothiophene, dihydrobenzothiophene, benzoxazole, benzothiazole, benzimidazole or indazole), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio

group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group;

Q represents an N-, S- or O-containing, optionally substituted, heterocyclic group or fused heterocyclic group, selected from the group consisting of the following formulas Q1 to Q60;





(in these formulas, Y, which may be same or different, represents halogen atom, cyano group, nitro group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A²-R⁷ (in this formula, A² and R⁷ are as defined above); m represents an integer of 0 to 6; R¹³ in the formula Q22 and Q23 represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ alkynyl group, halo C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy C₁-C₆ alkyl group, halo C₁-C₆ alkoxy C₁-C₆ alkyl group, C₁-C₆ alkylthio C₁-C₆ alkyl group, halo C₁-C₆ alkylthio C₁-C₆ alkyl group, C₁-C₆ alkylsulfinyl C₁-C₆ alkyl group, halo C₁-C₆ alkylsulfinyl C₁-C₆ alkyl group, C₁-C₆ alkylsulfonyl C₁-C₆ alkyl group, halo C₁-C₆ alkylsulfonyl C₁-C₆ alkyl group, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy

group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkyl group, substituted phenyl C₁-C₄ alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenylcarbonyl group, or substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group);

alternatively, Y may be taken conjointly with adjacent carbon atom on the ring to form a fused ring (the fused ring is as defined above), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined

above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group;

W represents O, S or N-R¹³ (in this formula, R¹³ is as defined above); and Z¹ and Z² represent oxygen atom or sulfur atom;

provided that (1) when X, R¹ and R³ simultaneously represent hydrogen atom, Z¹ and Z² simultaneously represent oxygen atom, Q represents Q27, and Y is a chlorine atom of 2-position, then R² is not 1,2,2-trimethylpropyl group.

(2) when X, R¹ and R³ simultaneously represent hydrogen atom, Z¹ and Z² simultaneously represent oxygen atom, Q represents Q27 and m is 0, then R² is not 1,2,2-trimethylpropyl group, and

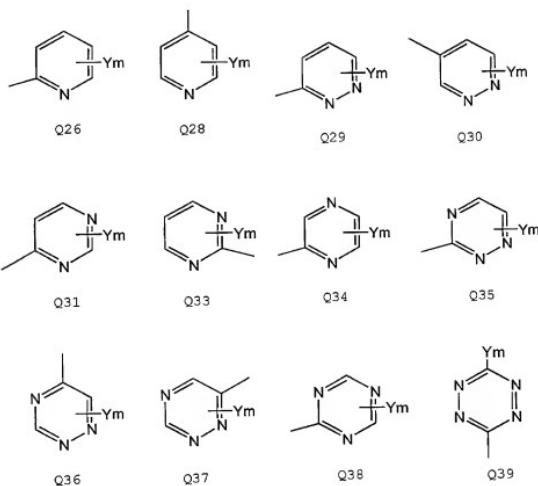
(3) when X, R¹ and R³ simultaneously represent hydrogen atom, Z¹ and Z² simultaneously represent oxygen atom, Q represents Q16 and Y represents methylthio group, then R² is not hydrogen atom and methyl group.

Claim 4. (Amended) A heterocyclic amine derivative represented by the following general formula (IV'):



wherein:

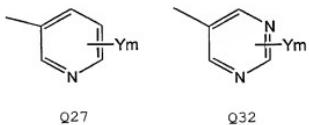
- [(1) in cases where Q' represents one of Q26, Q28-Q31 and Q33-Q39,



Y, which may be same or different, represents hydrogen atom, halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkyl-sulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group or halo C₁-C₆ alkylsulfonyl group, m represents an integer of 1 to 4, and at least one of Y, of which total number is m, is perfluoro C₂-C₆ alkyl group;

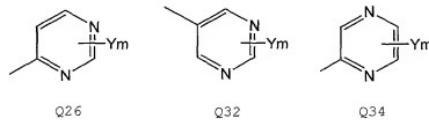
and

(2) in a case where Q' represents Q27 and Q32:



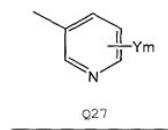
Y, which may be same or different, represents hydrogen atom, halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkyl-sulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group or halo C₁-C₆ alkylsulfonyl group, m represents an integer of 1 to 4, and at least one of Y, of which total number is m, is perfluoro C₂-C₆ alkyl group, halo C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy halo C₁-C₆ alkoxy group or halo C₁-C₆ alkylthio group]

- (1) in cases where Q' represents one of Q26, Q32 and Q34.



Y, which may be same or different, represents halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group or halo C₁-C₆ alkylsulfonyl group, m represents an integer of 1 to 4, and at least one of Y, of which total number is m, is perfluoro C₂-C₆ alkyl group; and

- (2) in a case where Q' represents Q27:



Y, which may be same or different, represents halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio

group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkyl-sulfonyl group or halo C₁-C₆ alkylsulfonyl group, m represents an integer of 1 to 4, and at least one of Y, of which total number is m, is perfluoro C₂-C₆ alkyl group, halo C₁-C₆ alkoxy group or halo C₁-C₆ alkylthio group,
provided that Y is not 2,2,2-trifluoroethoxy group.

1 581 Rec'd PCT 19 DEC 2001

DESCRIPTION

PHTHALAMIDE DERIVATIVES, INTERMEDIATES IN THE
PRODUCTION THEREOF, AND AGRICULTURAL/HORTICULTURAL
INSECTICIDES AND METHOD FOR USING THE SAME

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The present invention relates to phthalamide derivatives, production intermediates thereof, agrohorticultural insecticides containing said 5 compounds as active ingredient, and a method for using said insecticides.

RELATED ART

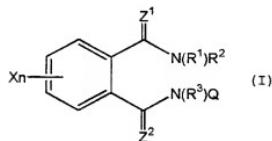
A part of the phthalamide derivatives of the present invention are disclosed in JP-A-59-163353, JP-10 A-61-180753, Journal of Chemical Society (J.C.S.), Perkin I, 1338-1350 (1978), etc. Neither description nor suggestion about usefulness of these compounds as an agrihorticultural insecticide, however, is made therein at all. On the other hand, the heterocyclic 15 amine derivatives represented by the general formula (IV), which serve as intermediate compounds for production of said phthalamide derivatives, are novel compounds not found in literature.

SUMMARY OF THE INVENTION

studies on the development of a novel agrohorticultural agent. As a result, it has been found that the phthalamide derivatives of the present invention represented by the general formula (I) which are novel 5 compounds and some known compounds disclosed in prior art are useful as novel agrohorticultural insecticides. It has further been found that the heterocyclic amine derivatives represented by the formulas (IV') which are novel compounds not found in literature are useful as 10 intermediates for production of a variety of physiologically active compounds usable as medical drugs, pesticides, etc. Based on these findings, the present invention has been accomplished.

DETAILED DESCRIPTION OF THE INVENTION

15 The present invention relates to phthalamide derivatives represented by the general formula (I):



(wherein R¹, R² and R³, which may be same or different, represent hydrogen atom, C₃-C₆ cycloalkyl group, halo C₃-20 C₆ cycloalkyl group or -A¹-(G), (in this formula, A¹ represents C₁-C₈ alkylene group, C₃-C₆ alkenylene group or C₃-C₆ alkynylene group; G, which may be same or different, represents hydrogen atom, halogen atom,

cyano group, nitro group, halo C₁-C₆ alkyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy carbonyl group, di(C₁-C₆) alkoxyphosphoryl group in which the (C₁-C₆) alkoxy groups may be same or
5 different, di(C₁-C₆) alkoxythiophosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, diphenylphosphino group, diphenylphosphono group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the
10 group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkyl-sulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆
15 alkylsulfonyl group, heterocyclic group (as used herein, the term "heterocyclic group" means pyridyl group, pyridine-N-oxide group, pyrimidinyl group, furyl group, tetrahydrofuryl group, thienyl group, tetrahydrothienyl group, tetrahydropyranyl group, oxazolyl group, isoxazolyl group, oxadiazolyl group, thiazolyl group, isothiazolyl group, thiadiazolyl group, imidazolyl group, triazolyl group or pyrazolyl group), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or
20 different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkyl-

- sulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -Z³-R⁴ (in this formula, Z³ represents -O-, -S-, -SO-, -SO₂-, -N(R⁵)- (in this formula, R⁵ represents hydrogen
- 5 atom, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, phenyl carbonyl group, substituted phenyl carbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆
- 10 alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkoxy carbonyl group, substituted
- 15 phenyl C₁-C₄ alkoxy carbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group,
- 20 halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, C₁-C₆ alkylsulfonyl group or halo C₁-C₆ alkylsulfonyl group), -C(=O)- or -C(=NOR⁶)- (in this formula, R⁶ represents hydrogen
- 25 atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, phenyl C₁-C₄ alkyl group, or substituted phenyl C₁-C₄ alkyl group having, on the

ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group), and R⁴ represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ alkynyl group, halo C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy C₁-C₆ alkyl group, C₁-C₆ alkylthio C₁-C₆ alkyl group, formyl group, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, mono (C₁-C₆) alkylaminocarbonyl group, di(C₁-C₆) alkylaminocarbonyl group in which the (C₁-C₆) alkyl groups may be same or different, mono(C₁-C₆) alkylaminothiocarbonyl group, di(C₁-C₆) alkylaminothiocarbonyl group in which the (C₁-C₆) alkyl groups may be same or different, di(C₁-C₆) alkoxyphosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, di(C₁-C₆) alkoxythiophosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkyl-

sulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkyl group, substituted phenyl (C₁-C₄) alkyl group having, on the ring thereof, at least one, 5 same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, 10 C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents 15 selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group 20 and halo C₁-C₆ alkylsulfonyl group); and r represents an integer of 1 to 4); further, R¹ and R² may be taken conjointly to form 4- to 7-membered rings which may be intercepted by 1 to 3, same or different oxygen atom, sulfur atom or nitrogen atom;

25 X, which may be same or different, represents halogen atom, cyano group, nitro group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or

different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkyl-

5 sulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at

10 least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkyl-

15 sulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A²-R⁷ [in this formula, A² represents -O-, -S-, -SO-, -SO₂-, -NR⁸- (in this formula R⁸ represents hydrogen atom, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl

20 group, phenylcarbonyl group, substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio-

25 group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₆ alkoxy carbonyl group or substituted phenyl

C₁-C₄ alkoxy carbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo
5 C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group), -C(=O)-, -C(=NOR⁶)- (in this formula, R⁶ is as defined above), C₁-C₆ alkylene group,
10 halo C₁-C₆ alkylene group, C₂-C₆ alkenylene group, halo C₂-C₆ alkenylene group, C₂-C₆ alkynylene group or halo C₃-C₆ alkynylene group; and
(1) in cases where A² represents -O-, -S-, -SO-, -SO₂- or -NR⁸- (in this formula, R⁸ is as defined above),
15 R⁷ represents hydrogen atom, halo C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkenyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group,
20 C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as
25 defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group,

halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6

5 alkylsulfonyl group, or $-A^3-R^9$ (in this formula, A^3 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and R^9 represents hydrogen atom, halogen atom,

10 C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy carbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6

15 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^4-R^{10}$ (in this formula, A^4 represents $-O-$, $-S-$, $-SO-$,

20 $-SO_2-$ or $-C(=O)-$; and R^{10} represents C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6

25 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl

group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group);

(2) in cases where A^2 represents $-C(=O)-$ or $-C(=NOR^6)-$ (in this formula, R^6 is as defined above), R^7 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_2-C_6 alkenyl group, halo C_2-C_6 alkenyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, mono(C_1-C_6) alkylamino group, di(C_1-C_6) alkylamino group in which the (C_1-C_6) alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenylamino group,

substituted phenylamino group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group; and

(3) in cases where A² represents C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₂-C₆ alkenylene group, halo C₂-C₆ alkenylene group, C₂-C₆ alkynylene group or halo C₃-C₆ alkynylene group, R' represents hydrogen atom, halogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy carbonyl group, tri(C₁-C₆) alkylsilyl group in which the (C₁-C₆) alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen

atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkyl-

5 sulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from

10 the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkyl-

15 sulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^5-R^{11}$ (in this formula, A^5 represents $-O-$, $-S-$, $-SO-$ or $-SO_2-$; and R^{11} represents C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the

20 group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkyl-

25 sulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different

substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkyl-thio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkyl-5 sulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A⁶-R¹² (in this formula, A⁶ represents C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₂-C₆ alkenylene group, halo C₂-C₆ alkenylene group, C₂-C₆ alkynylene group or 10 halo C₃-C₆ alkynylene group; and R¹² represents hydrogen atom, halogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl 15 group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkyl-sulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy 20 group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenoxy group, substituted phenoxy group having at least one, same or 25 different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkyl-

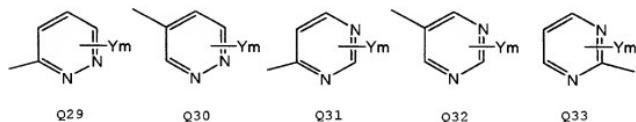
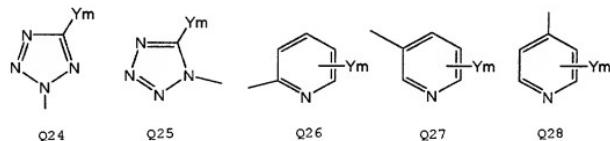
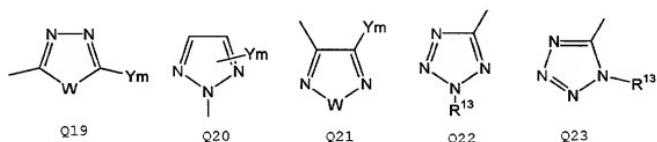
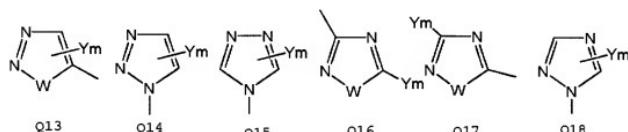
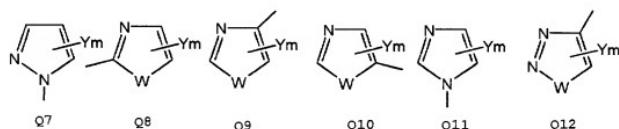
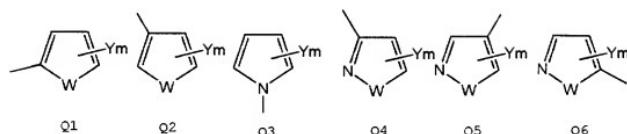
sulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected
5 from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group and halo
10 C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of
15 halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkyl-sulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl
20 group));;

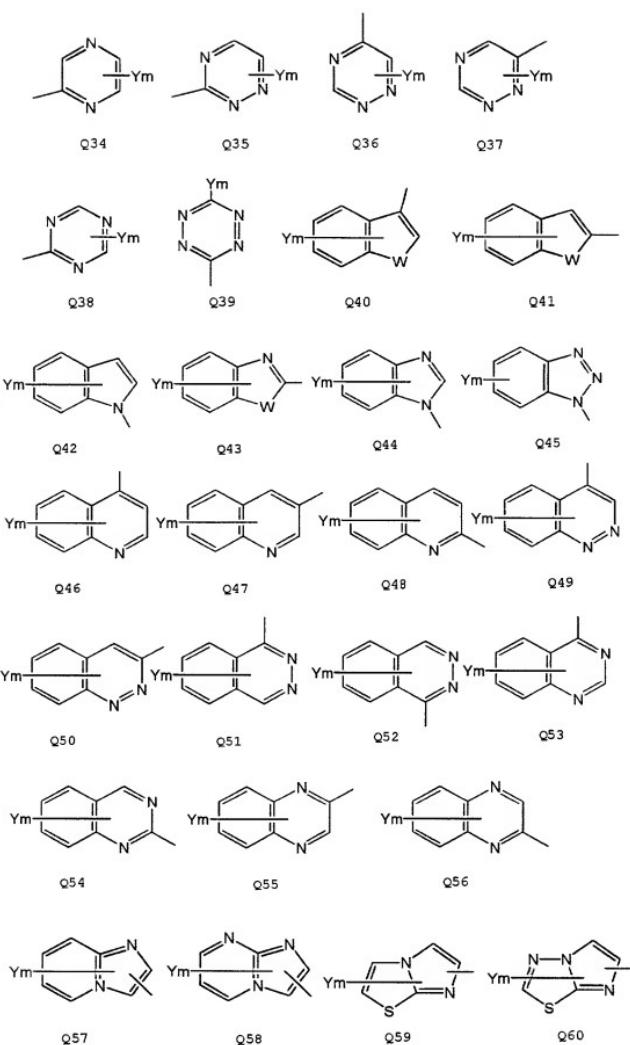
n represents an integer of 0 to 4; further, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring (as used herein, the term fused ring means naphthalene,
25 tetrahydronaphthalene, indene, indane, quinoline, quinazoline, chroman, isochroman, indole, indoline, benzodioxane, benzodioxole, benzofuran, dihydro-benzofuran, benzothiophene, dihydrobenzothiophene,

benzoxazole, benzothiazole, benzimidazole or indazole), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group;

Q represents an N-, S- or O-containing, optionally substituted, heterocyclic group or fused heterocyclic group, selected from the group consisting

of the following formulas Q1 to Q60;





- (in these formulas, Y, which may be same or different, represents halogen atom, cyano group, nitro group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substit-
- 5 uents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkyl-
- 10 sulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from
- 15 the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkyl-
- 20 sulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A²-R⁷ (in this formula, A² and R⁷ are as defined above); m represents an integer of 0 to 6; R¹³ in the formula Q22 and Q23 represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ alkynyl
- 25 group, halo C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy C₁-C₆ alkyl group, halo C₁-C₆ alkoxy C₁-C₆ alkyl group, C₁-C₆ alkylthio C₁-C₆ alkyl group, halo C₁-C₆ alkylthio C₁-C₆

- alkyl group, C_1-C_6 alkylsulfinyl C_1-C_6 alkyl group, halo
 C_1-C_6 alkylsulfinyl C_1-C_6 alkyl group, C_1-C_6 alkylsulfonyl
 C_1-C_6 alkyl group, halo C_1-C_6 alkylsulfonyl C_1-C_6 alkyl
group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkyl-
- 5 sulfonyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6
alkylcarbonyl group, C_1-C_6 alkoxy carbonyl group, phenyl
group, substituted phenyl group having at least one,
same or different substituents selected from the group
consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6
- 10 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group,
 C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6
alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group,
 C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl
group, phenyl C_1-C_6 alkyl group, substituted phenyl C_1-C_6
- 15 alkyl group having, on the ring thereof, at least one,
same or different substituents selected from the group
consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6
alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group,
 C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6
- 20 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group,
 C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl
group, phenyl carbonyl group, or substituted phenyl-
carbonyl group having at least one, same or different
substituents selected from the group consisting of
- 25 halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group,
 C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6
alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkyl-
sulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6

alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group); alternatively, Y may be taken conjointly with adjacent carbon atom on the ring to form a fused ring (the fused ring is as defined above), and said fused 5 ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl 10 group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group 15 consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl 20 group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy 25 group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group;

W represents O, S or N-R¹³ (in this formula, R¹³ is as defined above); and Z¹ and Z² represent oxygen atom or sulfur atom;

provided that when X, R¹ and R³ simultaneously represent hydrogen atom, Z¹ and Z² simultaneously represent oxygen atom, Q represents Q27, and Y is a chlorine atom of 2-position, then R² is not 1,2,2-trimethylpropyl group};

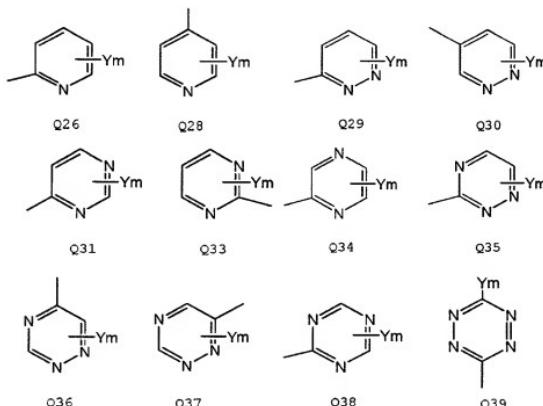
and to an agrohorticultural insecticide, and
10 a method for using the same.

The present invention further relates to a heterocyclic amine derivative represented by the following general formula (IV'):



15 wherein:

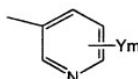
(1) in cases where Q' represents one of the following formulas Q26, Q28-Q31 and Q33-Q39,



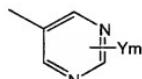
Y, which may be same or different, represents hydrogen atom, halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkyl-
 5 sulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group or halo C₁-C₆ alkylsulfonyl group, m represents an integer of 1 to 4, and at least one of Y,
 of which total number is m, is perfluoro C₂-C₆ alkyl group;

10 and

(2) in a case where Q' represents Q27 and Q32:



Q27



Q32

Y, which may be same or different, represents hydrogen atom, halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkyl-
 15 sulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group or halo C₁-C₆ alkylsulfonyl group, m represents an integer of 1 to 4, and at least one of Y,
 of which total number is m, is perfluoro C₂-C₆ alkyl group, halo C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy halo
 20 C₁-C₆ alkoxy group or halo C₁-C₆ alkylthio group.

The heterocyclic amine derivative of the formula (IV') is useful for an intermediate compound
 25 for production of the phthalamide derivatives of the

formula (I).

- In the definition of the general formula (I) of the phthalamide derivative of the present invention, "halogen atom" means chlorine atom, bromine atom, 5 iodine atom or fluorine atom; " C_1-C_6 alkyl" means a straight or branched chain alkyl group having 1 to 6 carbon atoms such as methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, s-butyl, t-butyl, n-pentyl, n-hexyl or the like; "halo C_1-C_6 alkyl" means a straight or 10 branched chain alkyl group having 1 to 6 carbon atoms substituted with at least one, same or different halogen atoms; and " C_2-C_8 alkylene" means a straight or branched chain alkylene group having 1 to 8 carbon atoms such as methylene, ethylene, propylene, 15 trimethylene, dimethylmethylen, tetramethylene, isobutylene, dimethylethylene, octamethylene or the like.

As examples of the " R^1 and R^2 taken conjointly to form a 4- to 7-membered ring which may be inter- 20 cepted by 1 to 3, same or different oxygen atom, sulfur atom or nitrogen atom", there can be referred to azetidine ring, pyrrolidine ring, pyrroline ring, piperidine ring, imidazolidine ring, imidazoline ring, oxazolidine ring, thiazolidine ring, isoxazolidine 25 ring, isothiazolidine ring, tetrahydropyridine ring, piperazine ring, morpholine ring, thiomorpholine ring, dioxazine ring, dithiazine ring, and the like.

Some of the phthalamide derivatives of the

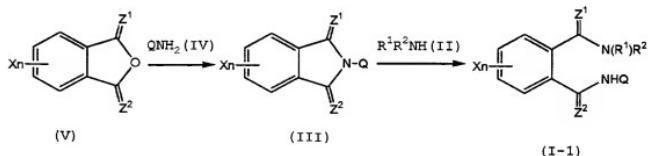
present invention represented by the general formula (I) have an asymmetric carbon atom or asymmetric center in the structural formulas thereof, and there can exist two optical isomers sometimes. The present invention 5 includes all such optical isomers and their mixtures at arbitrary proportions, and sometimes includes salts and hydrates thereof.

In the phthalamide derivatives of the present invention represented by the general formula (I), 10 preferable substituents are as follows. Thus, the phthalamide derivative of the invention is preferably a phthalamide derivative of the general formula (I) wherein R¹, R² and R³ may be same or different and represent hydrogen atom or -A¹-G (in this formula, A¹ 15 represents C₁-C₆ alkylene group and G represents hydrogen atom, C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, C₁-C₆ alkylcarbonyl-amino group or C₁-C₆ alkoxy carbonylamino group); X may be same or different and represents halogen atom, nitro 20 group, halo C₁-C₆ alkyl group, halo C₁-C₆ alkoxy group or halo C₁-C₆ alkylthio group; n represents an integer of 0 to 4; Q represents Q27; Y may be same or different and represents halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, 25 halo C₁-C₆ alkoxy halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, halo C₁-C₆ alkoxy halo C₁-C₆ alkylthio group, halo C₁-C₆ alkylsulfinyl group or halo C₁-C₆ alkylsulfonyl group; m represents an integer

of 0 to 4; Z^1 and Z^2 represent oxygen atom. Further preferably, the phthalamide derivative of the invention is a phthalamide derivative of general formula (I) wherein R^1 and R^3 represent hydrogen atom; R^2 represents
5 C_1-C_6 alkylthio C_1-C_6 alkyl group; X represents halogen atom; n represents an integer of 1 to 2; Q represents Q27; Y may be same or different and represents halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group or halo C_1-C_6 alkoxy group; m represents an
10 integer of 1 to 2; and Z^1 and Z^2 represent oxygen atom.

The compounds of the present invention can be produced according to Schemes 1 and 2 mentioned below, though the compounds of the present invention can also be produced by the process described in JP-A-11-240857.

15 Production process 1



wherein R^1 , R^2 , Z^1 , Z^2 , X , Q and n are as defined above.

A phthalic anhydride derivative represented by general formula (V) is reacted with a heterocyclic amine derivative represented by general formula (IV) in the presence of an inert solvent to form a phthalimide derivative represented by general formula (III). After isolating or without isolating the phthalimide deriv-

tive (III), (III) is reacted with an amine represented by general formula (II). Thus, a phthalamide derivative represented by general formula (I-1) can be produced.

5 (1) General formula (V) → General formula (III)

As the inert solvent used in this reaction, any solvent may be used so far as it does not disturb the progress of the reaction markedly. Examples of the inert solvent which can be used include aromatic

- 10 hydrocarbons such as benzene, toluene, xylene and the like, halogenated hydrocarbons such as methylene chloride, chloroform, carbon tetrachloride and the like, chlorinated aromatic hydrocarbons such as chlorobenzene, dichlorobenzene and the like, acyclic
15 and cyclic ethers such as diethyl ether, dioxane, tetrahydrofuran and the like, esters such as ethyl acetate and the like, amides such as dimethylformamide, dimethylacetamide and the like, acids such as acetic acid and the like, dimethyl sulfoxide, 1,3-dimethyl-2-
20 imidazolidinone, etc. These inert solvents may be used either singly or in combination or two or more solvents.

Since this reaction is an equimolar reaction, the reactants may be used in equimolar amounts. If
25 desired, however, any one reactant may be also used in excess. According to the need, this reaction may be carried out under a dehydrating condition.

The reaction may be carried out in a tempera-

ture range from room temperature to the refluxing temperature of the used inert solvent. Although the reaction time may vary depending on scale and temperature of the reaction, it may be appropriately selected 5 in a range from several minutes to 48 hours.

- After completion of the reaction, the objective product is isolated from the reaction system in the conventional manner and purified by the method of recrystallization, column chromatography, etc.
- 10 according to the need, whereby the objective product can be obtained. It is also possible to feed the objective product to the subsequent step without isolation.

The phthalic anhydride derivative represented 15 by the general formula (V) can be produced according to the method described in J. Org. Chem., 52, 129 (1987); J. Am. Chem. Soc., 51, 1865 (1929); ibid., 63, 1542 (1941), etc. The heterocyclic amine derivative represented by the general formula (IV) can be produced 20 according to the method described in J. Org. Chem., 18, 138 (1953); J. Org. Chem., 28, 1877 (1963); Chem. Ber., 89, 2742 (1956); Proc. Indian Acad. Sci., 37A, 758 (1953); J. Heterocycl. Chem., 17, 143 (1980); JP-A-62-96479; JP-A-10-340345; JP-A-11-302233; etc.

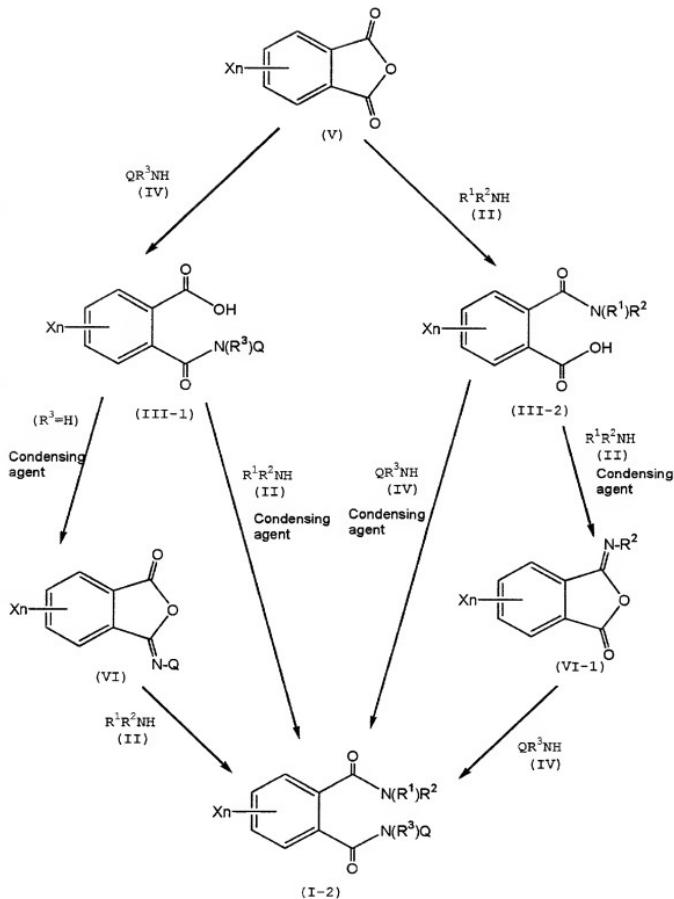
25 (2) General formula (III) → General formula (I-1)

As the inert solvents usable in this reaction, the same ones as those usable in the above-mentioned reaction (1) can be referred to. Since this

reaction is an equimolar reaction, the reactants may be used in equimolar amounts, though the amine of the general formula (II) may be used in excess, if desired. The reaction can be carried out in a temperature range 5 falling in a range from room temperature to the refluxing temperature of the used inert solvent. Although the reaction time varies depending on scale and temperature of the reaction, it may be selected appropriately in a range from several minutes to 48 hours.

10 After completion of the reaction, the objective product is isolated from the reaction system containing the product in a conventional manner. According to the need, the product is purified by the method of recrystallization, column chromatography, 15 etc., whereby the objective product can be obtained.

Production process 2



wherein R¹, R², R³, X, Q and n are as defined above.

A phthalic anhydride derivative represented by general formula (V) is reacted with an amine represented by general formula (II) in the presence of 5 an inert solvent to form a phthalamide represented by general formula (III-2). In cases where R¹ in (III-2) is hydrogen atom, the phthalamide (III-2) is isolated or not isolated and then subjected to a condensation reaction in the presence of a condensing agent to form 10 a compound represented by general formula (VI-1), and after isolating or without isolating (VI-1), the compound (VI-1) is reacted with a heterocyclic amine derivative represented by general formula (IV) in the presence of an inert solvent. In cases where R¹ in 15 phthalamide (III-2) is not hydrogen atom, (III-2) having been isolated or not isolated is subjected to a condensation reaction with a heterocyclic amine represented by general formula (IV) in the presence of a condensing agent. In these manners, a phthalamide 20 derivative represented by general formula (I-2) can be produced.

Alternatively, a phthalic anhydride derivative represented by general formula (V) is reacted with a heterocyclic amine derivative represented by general 25 formula (IV) in the presence of an inert solvent to form a phthalamide represented by general formula (III-1). In cases where R³ in (III-1) is hydrogen atom, the phthalamide (III-1) is isolated or not isolated, and

then subjected to a condensation reaction in the presence of a condensing agent to form a compound represented by general formula (VI), and after isolating or not isolating the compound (VI), (VI) is
5 subjected to a reaction with an amine represented by general formula (II) in the presence of an inert solvent. In cases where R³ in phthalamide (III-1) is not hydrogen atom, the phthalamide (III-1) having been isolated or not isolated is subjected to a condensation
10 reaction with an amine represented by general formula (II) in the presence of a condensing agent. In these manners, a phthalamide derivative represented by general formula (I-2) can be obtained.

(1) General formula (V) → General formula (III-2) or
15 General formula (VI-1) → General formula (I-2)

This reaction can be practiced in the same manner as in Production process 1-(2), whereby the objective product can be obtained.

(2) General formula (III-1) → General formula (VI) or
20 General formula (III-2) → General formula (VI-1)

This reaction can be practiced according to the description of J. Med. Chem., 10, 982 (1967), whereby the objective product can be obtained.

(3) General formula (VI) → General formula (I-2) or
25 General formula (V) → General formula (III-2)

This reaction can be practiced in the same manner as in Production process 1-(2), whereby the objective product can be obtained.

- (4) General formula (III-1) or General formula (III-2)
→ General formula (I-2)

This reaction can be practiced by reacting a phthalamide derivative represented by general formula 5 (III-1) or (III-2) with an amine represented by general formula (II) or (IV) in the presence of a condensing agent and an inert solvent. This reaction may be practiced in the presence of a base, if necessary.

As examples of the inert solvent used in this 10 reaction, tetrahydrofuran, diethyl ether, dioxane, chloroform, methylene chloride and the like can be referred to. As examples of the condensing agent used in this reaction, those used in the conventional production of amides can be used, of which examples 15 include Mukaiyama reagent (2-chloro-N-methylpyridinium iodide), DCC (1,3-dicyclohexylcarbodiimide), CDI (carbonyl diimidazole), DEPC (diethyl cyanophosphonate), etc. The amount of the condensing agent may be appropriately selected in a range from an equimolar 20 amount to an excessive molar amount based on the phthalamide derivative represented by general formula (III-1) or (III-2).

As examples of the base which can be used in this reaction, organic bases such as triethylamine, 25 pyridine and the like, and inorganic bases such as potassium carbonate and the like can be referred to. The amount of the base may be appropriately selected in the range from an equimolar amount to an excessive

molar amount based on the phthalamide derivative represented by general formula (III-1) or (III-2).

The reaction can be carried out in a temperature range from 0°C to the boiling point of the
5 used inert solvent. Although the reaction time may vary depending on scale and temperature of the reaction, it is in the range of from several minutes to 48 hours.

After completion of the reaction, the objective product is isolated from the reaction system by the conventional method, and the product may be purified by recrystallization, column chromatography, etc. according to the need, whereby the objective product can be obtained.

15 Next, typical examples of the heterocyclic amine derivative represented by general formula (IV') are listed in Table 1, and typical examples of the phthalamide derivative represented by general formula (I) are listed in Tables 2 to 12. The present invention is by no means limited by the compounds shown herein. In the tables shown below, "Me" means methyl, "Et" means ethyl, "Pr" means propyl, "Bu" means butyl, "Ac" means acetyl, "Ph" means phenyl, the expression "c—" means an alicyclic hydrocarbon, "mp" means melting point, and "nD" means refractive index.

General formula (IV'):



(IV')

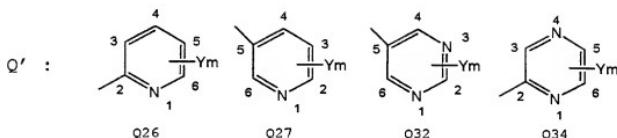


Table 1

No.	Q'	Ym	mp ($^{\circ}\text{C}$) or $^1\text{H-NMR}$ [δ (ppm/ CDCl_3)]
IV'-1	Q26	3-Me-5-C ₂ F ₅	2.17(s. 3H), 4.82(br. 2H), 7.42(d. 1H), 8.16(s. 1H).
IV'-2	Q26	3-Me-5-n-C ₃ F ₇	2.18(s. 3H), 4.94(br. 2H), 7.41(d. 1H), 8.19(s. 1H).
IV'-3	Q26	3-Me-5-i-C ₃ F ₇	2.18(s. 3H), 4.80(br. 2H), 7.42(d. 1H), 8.15(s. 1H).

Table 1 (Continued)

No.	Q'	Ym	mp (°C) or $^1\text{H-NMR}$ [δ (ppm/ CDCl_3)]
IV'-4	Q27	2-n-C ₃ F ₇	4.08(br. 2H), 7.04(dd. 1H), 7.43(d. 1H), 8.16(d. 1H).
IV'-5	Q27	6-Cl-2-n-C ₃ F ₇	4.65(br. 2H), 7.17(d. 1H), 7.57(d. 1H).
IV'-6	Q27	2-C ₂ F ₅	3.72(br. 2H), 7.04(dd. 1H), 7.46(d. 1H), 8.16(d. 1H).
IV'-7	Q27	2-i-C ₃ F ₇	4.12(br. 2H), 7.06(dd. 1H), 7.44(dd. 1H), 8.13(d. 1H).
IV'-8	Q27	4-Me-2-i-C ₃ F ₇	2.22(s. 3H), 4.12(br. 2H), 7.34(d. 1H), 8.07(s. 1H).
IV'-9	Q27	4-Me-6-i-C ₃ F ₇	2.21(s. 3H), 4.26(br. 2H), 7.09(dd. 1H), 7.98(d. 1H).
IV'-10	Q27	6-Me-2-i-C ₃ F ₇	2.42(s. 3H), 4.12(br. 2H), 6.98(d. 1H), 7.31(dd. 1H).
IV'-11	Q27	6-Cl-2-i-C ₃ F ₇	4.40(br. 2H), 7.12(d. 1H), 7.41(dd. 1H).
IV'-12	Q27	6-F-2-i-C ₃ F ₇	
IV'-13	Q27	6-i-C ₃ F ₇	4.28(br. 2H), 7.04(dd. 1H), 7.18(m. 1H), 8.07(d. 1H).
IV'-14	Q27	4,6-Cl ₂ -2-i-C ₃ F ₇	4.80(br. 2H), 7.53(d. 1H).
IV'-15	Q27	6-MeO-2-i-C ₃ F ₇	3.96(s. 3H), 4.03(br. 2H), 6.91(d. 1H), 7.10(dd. 1H).
IV'-16	Q27	6-MeS-2-i-C ₃ F ₇	2.58(s. 3H), 4.00(br. 2H), 6.91(d. 1H), 7.22(dd. 1H).
IV'-17	Q27	6-MeSO-2-i-C ₃ F ₇	

Table 1 (Continued)

No.	Q'	Ym	mp (°C) or $^1\text{H-NMR}$ [δ (ppm/CDCl ₃)]
IV'-18	Q27	6-MeSO ₂ -2-I-C ₃ F ₇	
IV'-19	Q32	4-Me-2-i-C ₃ F ₇	2.46(s. 3H), 3.94(br. 2H), 8.15(s. 1H).
IV'-20	Q32	4-Me-6-i-C ₃ F ₇	2.49(s. 3H), 4.35(br. 2H), 8.55(s. 1H).
IV'-21	Q34	5-i-C ₃ F ₇	5.0(br. 2H), 8.01(s. 1H), 8.31(s. 1H).
IV'-22	Q27	2-OCF ₂ CHF ₂	3.43(br. 2H), 6.13(tt. 1H), 6.88(d. 1H), 7.08(dd. 1H), 7.74(d. 1H).
IV'-23	Q27	2-OCHF ₂	3.60(br. 2H), 6.72(d. 1H), 7.07(dd. 1H), 7.26(dd. 1H), 7.63(d. 1H).
IV'-24	Q27	6-Me-2-OCHF ₂	1.30(s. 3H), 3.45(br. 2H), 6.58(d. 1H), 6.98(d. 1H), 7.30(t. 1H).
IV'-25	Q27	2-SCHF ₂	3.81(br. 2H), 6.94(dd. 1H), 7.24(t. 1H), 7.25(d. 1H), 8.06(d. 1H).
IV'-26	Q27	6-Me-2-SCHF ₂	44-46°C
IV'-27	Q27	2-OCH(CF ₃) ₂	3.70(br. 2H), 6.40(m. 1H), 6.76(d. 1H), 7.08(dd. 1H), 7.59(d. 1H).
IV'-28	Q27	6-Me-2-OCH(CF ₃) ₂	2.33(s. 3H), 3.45(br. 2H), 6.49(m. 1H), 6.64(d. 1H), 7.03(d. 1H).
IV'-29	Q27	6-Cl-2-OCH(CF ₃) ₂	3.89(br. 2H), 6.24(m. 1H), 6.76(d. 1H), 7.16(d. 1H).
IV'-30	Q27	6-F-2-OCH(CF ₃) ₂	
IV'-31	Q27	6-OMe-2-OCH(CF ₃) ₂	3.15-3.60(br. 2H), 3.95(s. 3H), 6.15(m. 1H), 6.38(d. 1H), 6.99(d. 1H).
IV'-32	Q27	6-Cl-2-SCH(CF ₃) ₂	
IV'-33	Q27	6-Me-2-SCH(CF ₃) ₂	

Table 1 (Continued)

No.	Q'	Ym	mp (°C) or ¹ H-NMR [δ (ppm/CDCl ₃)]
IV'-34	Q27	6-F-2-SCH(CF ₃) ₂	
IV'-35	Q27	6-OMe-2-SCH(CF ₃) ₂	
IV'-36	Q27	2-OCF ₂ CHFOCF ₃	
IV'-37	Q27	6-Me-2-OCF ₂ CHFOCF ₃	2.35(s. 3H), 3.50(br. 2H), 6.31(dt. 1H), 6.77(d. 1H), 7.01(d. 1H).
IV'-38	Q27	6-Cl-2-OCF ₂ CHFOCF ₃	
IV'-39	Q27	2-OCF ₂ CHFO-n-C ₃ F ₇	3.20(br. 2H), 6.43(dt. 1H), 6.84(d. 1H), 7.08(dd. 1H), 7.73(d. 1H).
IV'-40	Q27	6-Me-2-OCF ₂ CHFO-n-C ₃ F ₇	2.35(s. 3H), 3.60(br. 2H), 6.50(dt. 1H), 6.74(d. 1H), 7.02(d. 1H).
IV'-41	Q27	6-Cl-2-OCF ₂ CHFO-n-C ₃ F ₇	3.40(br. 2H), 6.37(dt. 1H), 6.85(d. 1H), 7.14(d. 1H).
IV'-42	Q27	6-Me-2-OCF ₂ CHFCF ₃	2.36(s. 3H), 3.30(br. 2H), 5.35(m. 1H), 6.76(d. 1H), 7.01(d. 1H).
IV'-43	Q27	6-Me-2-OCF=CFCF ₃	2.04(s. 3H), 3.10(br. 2H), 6.65(d. 0.5H), 6.69(d. 0.5H), 7.03(d. 1H). (E, Z mixture)
IV'-44	Q27	6-Me-2-OCH(CF ₃) ₂	2.20(s. 3H), 3.20-3.60(br. 2H), 6.41(m. 1H), 6.67(s. 1H), 7.55(s. 1H).
IV'-45	Q27	6-Me-2-OCF ₂ CHF ₂	2.37(s. 3H), 3.40(br. 2H), 6.16(tt. 1H), 6.79(d. 1H), 7.06(d. 1H).
IV'-46	Q27	6-Cl-2-OCF ₂ CHF ₂	3.50(br. 2H), 6.11(tt. 1H), 6.88(d. 1H), 7.15(d. 1H).
IV'-47	Q27	6-Me-2-OCH ₂ C ₂ F ₅	2.31(s. 3H), 3.33(br. 2H), 4.75(t. 2H), 6.55(d. 1H), 6.98(d. 1H).

General formula (I):

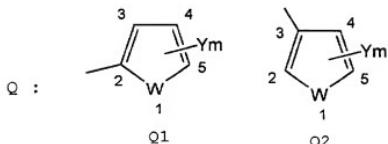
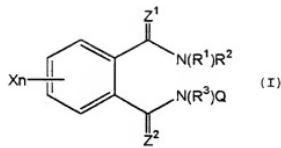


Table 2 ($Z^1 = Z^2 = O$)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q1	1-1	3-Cl	H	i-Pr	H	O	H	
Q1	1-2	3-Cl	H	i-Pr	H	O	3-Me-5-C ₂ F ₅	
Q1	1-3	3-Cl	H	i-Pr	H	S	4,5-Bz ₂	143
Q1	1-4	3-Br	H	i-Pr	H	O	3-Me-5-n-C ₃ F ₇	
Q1	1-5	3-NO ₂	H	i-Pr	H	O	3-Me-5-i-C ₃ F ₇	
Q1	1-6	3-I	H	i-Pr	H	S	H	
Q1	1-7	3-I	H	i-Pr	H	S	3-Me	207
Q1	1-8	3-I	H	i-Pr	H	S	5-Cl	
Q1	1-9	3-I	H	i-Pr	H	S	5-C ₂ F ₅	
Q1	1-10	3-I	H	i-Pr	H	S	5-n-C ₃ F ₇	
Q1	1-11	3-I	H	i-Pr	H	S	5-i-C ₃ F ₇	
Q1	1-12	3-I	H	i-Pr	H	S	3-Me-5-t-Bu	160
Q1	1-13	3-I	H	i-Pr	H	S	3-Me-5-Br	
Q1	1-14	3-I	H	i-Pr	H	S	3-Me-5-C ₂ F ₅	
Q1	1-15	3-I	H	i-Pr	H	S	3-Me-5-n-C ₃ F ₇	
Q1	1-16	3-I	H	i-Pr	H	S	3-Me-5-i-C ₃ F ₇	
Q1	1-17	3-I	H	i-Pr	H	S	3-Me-4-C ₂ F ₅	
Q1	1-18	3-I	H	i-Pr	H	S	3-Me-4-n-C ₃ F ₇	
Q1	1-19	3-I	H	i-Pr	H	S	3-Me-4-i-C ₃ F ₇	
Q1	1-20	3-I	H	t-Bu	H	NMe	5-i-C ₃ F ₇	
Q1	1-21	3-I	H	t-Bu	H	NMe	5-C ₂ F ₅	
Q1	1-22	3-I	H	t-Bu	H	NMe	5-n-C ₃ F ₇	
Q1	1-23	3-I	H	t-Bu	H	NMe	3-Me-5-i-C ₃ F ₇	

Table 2 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q1	1-24	3-I	H	CH(CH ₃)CH ₂ SCH ₃	H	S	3-Me-5-i-C ₃ F ₇	
Q1	1-25	3-I	H	CH(CH ₃)CH ₂ SOCH ₃	H	S	3-Me-5-i-C ₃ F ₇	
Q1	1-26	3-I	H	CH(CH ₃)CH ₂ SO ₂ CH ₃	H	S	3-Me-5-i-C ₃ F ₇	
Q1	1-27	3-I	H	C(CH ₃) ₂ CH ₂ SCH ₃	H	S	3-Me-5-i-C ₃ F ₇	
Q1	1-28	3-I	H	C(CH ₃) ₂ CH ₂ SOCH ₃	H	S	3-Me-5-i-C ₃ F ₇	
Q1	1-29	3-I	H	C(CH ₃) ₂ CH ₂ SO ₂ CH ₃	H	S	3-Me-5-i-C ₃ F ₇	
Q1	1-30	3-I	H	CH(CH ₃)CH ₂ NHAc	H	S	3-Me-5-i-C ₃ F ₇	
Q1	1-31	3-I	H	C(CH ₃) ₂ CH ₂ NHAc	H	S	3-Me-5-i-C ₃ F ₇	
Q1	1-32	3-I	H	CH(CH ₃)CH ₂ CH ₂ OCH ₃	H	S	3-Me-5-i-C ₃ F ₇	
Q1	1-33	3-I	H	C(CH ₃) ₂ CH ₂ CH ₂ OCH ₃	H	S	3-Me-5-i-C ₃ F ₇	
Q1	1-34	3-I	Et	Et		H O	H	
Q1	1-35	3-I	Et	Et		H O	3-Me-5-C ₂ F ₅	
Q1	1-36	3-I	Et	Et		H O	3-Me-5-n-C ₃ F ₇	
Q1	1-37	3-I	Et	Et		H O	3-Me-5-i-C ₃ F ₇	
Q1	1-38	3-I	Et	Et		H O	5-Cl	
Q1	1-39	3-I	Et	Et		H O	5-Br	
Q1	1-40	3-I	Et	Et		H O	5-n-C ₃ F ₇	
Q1	1-41	6-I	H	i-Pr		H S	3-Me-5-t-Bu	97
Q1	1-42	6-I	H	i-Pr		H S	3-Me	168
Q1	1-43	3-CF ₃	H	i-Pr		H NMe	3-Me-5-C ₂ F ₅	
Q1	1-44	3-Ph	H	i-Pr		H NMe	3-Me-5-n-C ₃ F ₇	
Q1	1-45	3-SOCF ₃	H	i-Pr		H NMe	3-Me-5-i-C ₃ F ₇	
Q1	1-46	3-C ₂ F ₅	H	i-Pr		H NMe	3-Me-5-C ₂ F ₅	

Table 2 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q1	1-47	3-I-4-Cl	H	i-Pr	H	NMe	3-Me-5-n-C ₃ F ₇	
Q1	1-48	3-I-4-CF ₃	H	i-Pr	H	S	3-Me-5-i-C ₃ F ₇	
Q1	1-49	3-CF ₃ -4-Cl	H	i-Pr	H	S	3-Me-5-C ₂ F ₅	
Q1	1-50	3-OCF ₂ O-4	H	i-Pr	H	S	3-Me-5-n-C ₃ F ₇	
Q1	1-51	3-OCF ₂ CF ₂ O-4	H	i-Pr	H	S	3-Me-5-i-C ₃ F ₇	
Q2	2- 1	3-I	H	i-Pr	H	S	2-Me-5-C ₂ F ₅	
Q2	2- 2	3-I	H	i-Pr	H	S	2-Me-5-n-C ₃ F ₇	
Q2	2- 3	3-I	H	i-Pr	H	S	2-Me-5-i-C ₃ F ₇	
Q2	2- 4	3-I	H	i-Pr	H	S	4-Me-5-C ₂ F ₅	
Q2	2- 5	3-I	H	i-Pr	H	S	4-Me-5-n-C ₃ F ₇	
Q2	2- 6	3-I	H	i-Pr	H	S	4-Me-5-i-C ₃ F ₇	
Q2	2- 7	3-I	H	t-Bu	H	NMe	5-i-C ₃ F ₇	
Q2	2- 8	3-I	H	t-Bu	H	NMe	5-C ₂ F ₅	
Q2	2- 9	3-I	H	t-Bu	H	NMe	5-n-C ₃ F ₇	
Q2	2-10	3-I	H	t-Bu	H	NMe	4-Me-5-i-C ₃ F ₇	
Q2	2-11	3-I H CH(CH ₃)CH ₂ SCH ₃			H	S	4-Me-5-i-C ₃ F ₇	
Q2	2-12	3-I H CH(CH ₃)CH ₂ SOCH ₃			H	S	4-Me-5-i-C ₃ F ₇	
Q2	2-13	3-I H CH(CH ₃)CH ₂ SO ₂ CH ₃			H	S	4-Me-5-i-C ₃ F ₇	
Q2	2-14	3-I H C(CH ₃) ₂ CH ₂ SCH ₃			H	S	4-Me-5-i-C ₃ F ₇	
Q2	2-15	3-I H C(CH ₃) ₂ CH ₂ SOCH ₃			H	S	2-Me-5-i-C ₃ F ₇	
Q2	2-16	3-I H C(CH ₃) ₂ CH ₂ SO ₂ CH ₃			H	S	2-Me-5-i-C ₃ F ₇	
Q2	2-17	3-I H CH(CH ₃)CH ₂ NHAc			H	S	2-Me-5-i-C ₃ F ₇	
Q2	2-18	3-I H C(CH ₃) ₂ CH ₂ NHAc			H	S	2-Me-5-i-C ₃ F ₇	

Table 2 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q2	2-19	3-I	H	CH(CH ₃)CH ₂ CH ₂ OCH ₃	H	S	2-Me-5-i-C ₃ F ₇	
Q2	2-20	3-I	H	C(CH ₃) ₂ CH ₂ CH ₂ OCH ₃	H	S	4-Me-5-i-C ₃ F ₇	
Q2	2-21	3-I	Et	Et		H	O H	
Q2	2-22	3-I	Et	Et		H	O 2-Me-5-C ₂ F ₅	
Q2	2-23	3-I	Et	Et		H	O 2-Me-5-n-C ₃ F ₇	
Q2	2-24	3-I	Et	Et		H	O 4-Me-5-i-C ₃ F ₇	

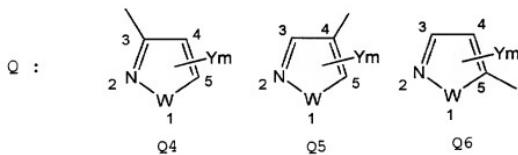


Table 3 ($Z^1 = Z^2 = 0$)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q4	4-1	H	H	i-Pr	H	O	5-Me	185
Q4	4-2	3-Cl	H	i-Pr	H	O	H	
Q4	4-3	3-Cl	H	i-Pr	H	O	4-Me-5-C ₂ F ₅	
Q4	4-4	3-Cl	H	i-Pr	H	O	4,5-Br ₂	
Q4	4-5	3-Cl	H	i-Pr	H	O	5-Me	136
Q4	4-6	3-Cl	H	i-Pr	H	O	5-(4-Br-Ph)	158
Q4	4-7	3-Cl	H	i-Pr	H	O	4-Me-5-(4-Cl-Ph)	184
Q4	4-8	6-Cl	H	i-Pr	H	O	4-Me-5-(4-Cl-Ph)	101
Q4	4-9	3-Br	H	i-Pr	H	O	4-Me-5-n-C ₂ F ₇	
Q4	4-10	3-NO ₂	H	i-Pr	H	O	4-Me-5-i-C ₃ F ₇	
Q4	4-11	3-I	H	i-Pr	H	O	4-Me	144
Q4	4-12	3-I	H	i-Pr	H	O	4-Me-5-CF ₃	151
Q4	4-13	3-I	H	i-Pr	H	S	H	
Q4	4-14	3-I	H	i-Pr	H	S	4-Me	
Q4	4-15	3-I	H	i-Pr	H	S	5-Cl	
Q4	4-16	3-I	H	i-Pr	H	S	5-C ₂ F ₅	
Q4	4-17	3-I	H	i-Pr	H	S	5-n-C ₃ F ₇	
Q4	4-18	3-I	H	i-Pr	H	S	5-i-C ₃ F ₇	
Q4	4-19	3-I	H	i-Pr	H	S	4-Me-5-t-Bu	
Q4	4-20	3-I	H	i-Pr	H	S	4-Me-5-Br	
Q4	4-21	3-I	H	i-Pr	H	S	4-Me-5-C ₂ F ₅	
Q4	4-22	3-I	H	i-Pr	H	S	4-Me-5-n-C ₂ F ₇	
Q4	4-23	3-I	H	i-Pr	H	S	4-Me-5-i-C ₃ F ₇	

Table 3 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q4	4-24	3-I	H	t-Bu		H NMe	5-i-C ₃ F ₇	
Q4	4-25	3-I	H	t-Bu		H NMe	5-C ₂ F ₅	
Q4	4-26	3-I	H	t-Bu		H NMe	5-n-C ₃ F ₇	
Q4	4-27	3-I	H	t-Bu		H NMe	4-Me-5-i-C ₃ F ₇	
Q4	4-28	3-I	H	CH(CH ₃)CH ₂ SCH ₃		H S	4-Me-5-i-C ₃ F ₇	
Q4	4-29	3-I	H	CH(CH ₃)CH ₂ SOCH ₃		H S	4-Me-5-i-C ₃ F ₇	
Q4	4-30	3-I	H	CH(CH ₃) ₂ CH ₂ SO ₂ CH ₃		H S	4-Me-5-i-C ₃ F ₇	
Q4	4-31	3-I	H	C(CH ₃) ₂ CH ₂ SCH ₃		H S	4-Me-5-i-C ₃ F ₇	
Q4	4-32	3-I	H	C(CH ₃) ₂ CH ₂ SOCH ₃		H S	4-Me-5-i-C ₃ F ₇	
Q4	4-33	3-I	H	C(CH ₃) ₂ CH ₂ SO ₂ CH ₃		H S	4-Me-5-i-C ₃ F ₇	
Q4	4-34	3-I	H	CH(CH ₃)CH ₂ NHAC		H S	4-Me-5-i-C ₃ F ₇	
Q4	4-35	3-I	H	C(CH ₃) ₂ CH ₂ NHAC		H S	4-Me-5-i-C ₃ F ₇	
Q4	4-36	3-I	H	CH(CH ₃)CH ₂ CH ₂ OCH ₃		H S	4-Me-5-i-C ₃ F ₇	
Q4	4-37	3-I	H	C(CH ₃) ₂ CH ₂ CH ₂ OCH ₃		H S	4-Me-5-i-C ₃ F ₇	
Q4	4-38	3-I	Et	Et		H O	H	
Q4	4-39	3-I	Et	Et		H O	4-Me-5-C ₂ F ₅	
Q4	4-40	3-I	Et	Et		H O	4-Me-5-n-C ₃ F ₇	
Q4	4-41	3-I	Et	Et		H O	4-Me-5-i-C ₃ F ₇	
Q4	4-42	3-I	Et	Et		H O	5-Cl	
Q4	4-43	3-I	Et	Et		H O	5-Br	
Q4	4-44	3-I	Et	Et		H O	5-n-C ₃ F ₇	
Q4	4-45	6-I	H	i-Pr		H O	4-Me-5-CF ₃	143
Q4	4-46	3-CF ₃	H	i-Pr		H NMe	4-Me-5-C ₂ F ₅	

Table 3 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q4	4-47	3-Ph	H	i-Pr	H	NMe	4-Me-5-n-C ₃ F ₇	
Q4	4-48	3-SOCF ₃	H	i-Pr	H	NMe	4-Me-5-i-C ₃ F ₇	
Q4	4-49	3-C ₂ F ₅	H	i-Pr	H	NMe	4-Me-5-C ₂ F ₅	
Q4	4-50	3-I-4-Cl	H	i-Pr	H	NMe	4-Me-5-n-C ₃ F ₇	
Q4	4-51	3-I-4-CF ₃	H	i-Pr	H	S	4-Me-5-i-C ₃ F ₇	
Q4	4-52	3-CF ₃ -4-Cl	H	i-Pr	H	S	4-Me-5-C ₂ F ₅	
Q4	4-53	3-OCF ₂ O-4	H	i-Pr	H	S	4-Me-5-n-C ₃ F ₇	
Q4	4-54	3-OCH ₂ CF ₃ O-4	H	i-Pr	H	S	4-Me-5-i-C ₃ F ₇	
Q5	5- 1	3-Cl	H	i-Pr	H	O	H	
Q5	5- 2	3-Cl	H	i-Pr	H	O	3-Me-5-Cl	
Q5	5- 3	3-Cl	H	i-Pr	H	O	3,5-Br ₂	
Q5	5- 4	3-Cl	H	i-Pr	H	NMe	3-Me	180
Q5	5- 5	3-Cl	H	i-Pr	H	NMe	3-Me-5-OMe	220
Q5	5- 6	3-Cl	H	n-Pr	H	NMe	3-Me-5-OMe	90
Q5	5- 7	3-Cl	H	n-Pr	H	NMe	3-Me-5-OPh	190
Q5	5- 8	6-Cl	H	i-Pr	H	NMe	3-Me-5-OPh	245
Q5	5- 9	6-Cl	H	i-Pr	H	NMe	3-Me-5-OMe	175
Q5	5-10	3-Br	H	i-Pr	H	O	3,5-Me ₂	
Q5	5-11	3-NO ₂	H	i-Pr	H	O	3,5-Me ₂	
Q5	5-12	3-I	H	i-Pr	H	O	3-CF ₃	
Q5	5-13	3-I	H	i-Pr	H	O	5-CF ₃	
Q5	5-14	3-I	H	i-Pr	H	S	H	
Q5	5-15	3-I	H	i-Pr	H	S	3-Me	

Table 3 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q5	5-16	3-I	H i-Pr		H S		5-Cl	
Q5	5-17	3-I	H i-Pr		H S		5-C ₂ F ₅	
Q5	5-18	3-I	H i-Pr		H S		5-n-C ₃ F ₇	
Q5	5-19	3-I	H i-Pr		H S		5-i-C ₃ F ₇	
Q5	5-20	3-I	H i-Pr		H S		3-C ₂ F ₅	
Q5	5-21	3-I	H i-Pr		H S		3-n-C ₃ F ₇	
Q5	5-22	3-I	H i-Pr		H S		3-i-C ₃ F ₇	
Q5	5-23	3-I	H i-Pr		H S		3-Me-5-Br	
Q5	5-24	3-I	H i-Pr		H S		3-Me-5-C ₂ F ₅	
Q5	5-25	3-I	H i-Pr		H S		3-Me-5-n-C ₃ F ₇	
Q5	5-26	3-I	H i-Pr		H S		3-Me-5-i-C ₃ F ₇	
Q5	5-27	3-I	H t-Bu		H NMe		5-i-C ₃ F ₇	
Q5	5-28	3-I	H t-Bu		H NMe		5-C ₂ F ₅	
Q5	5-29	3-I	H t-Bu		H NMe		5-n-C ₃ F ₇	
Q5	5-30	3-I	H CH(CH ₃)CH ₂ SCH ₃		H NMe		3,5-Me ₂	
Q5	5-31	3-I	H CH(CH ₃)CH ₂ SOCH ₃		H NMe		3,5-Me ₂	
Q5	5-32	3-I	H CH(CH ₃)CH ₂ SO ₂ CH ₃		H NMe		3,5-Me ₂	
Q5	5-33	3-I	H C(CH ₃) ₂ CH ₂ SCH ₃		H NMe		3,5-Me ₂	
Q5	5-34	3-I	H C(CH ₃) ₂ CH ₂ SOCH ₃		H NMe		3,5-Me ₂	
Q5	5-35	3-I	H C(CH ₃) ₂ CH ₂ SO ₂ CH ₃		H NMe		3,5-Me ₂	
Q5	5-36	3-I	H CH(CH ₃)CH ₂ NHAc		H NMe		3,5-Me ₂	
Q5	5-37	3-I	H C(CH ₃) ₂ CH ₂ NHAc		H NMe		3,5-Me ₂	
Q5	5-38	3-I	H CH(CH ₃)CH ₂ CH ₂ OCH ₃		H NMe		3,5-Me ₂	

Table 3 (Continued)

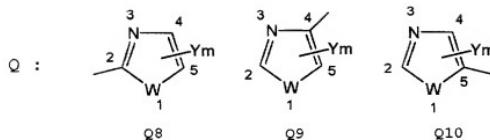
Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q5	5-39	3-I	H	C(CH ₃) ₂ CH ₂ OCH ₃	H	NMe	3,5-Me ₂	
Q5	5-40	3-I		Et	Et	H	O	H
Q5	5-41	3-I		Et	Et	H	O	3-Me-5-C ₂ F ₅
Q5	5-42	3-I		Et	Et	H	O	3-Me-5-n-C ₃ F ₇
Q5	5-43	3-I		Et	Et	H	O	3-Me-5-i-C ₃ F ₇
Q5	5-44	3-I		Et	Et	H	O	5-Cl
Q5	5-45	3-I		Et	Et	H	O	5-Br
Q5	5-46	3-I		Et	Et	H	O	5-n-C ₃ F ₇
Q5	5-47	3-I		Et	Et	H	O	5-n-C ₃ F ₇
Q5	5-48	3-CF ₃	H	i-Pr	H	NMe	3-Me-5-C ₂ F ₅	
Q5	5-49	3-Ph	H	i-Pr	H	NMe	3-Me-5-n-C ₃ F ₇	
Q5	5-50	3-SOCF ₃	H	i-Pr	H	NMe	3-Me-5-i-C ₃ F ₇	
Q5	5-51	3-C ₂ F ₅	H	i-Pr	H	NMe	3-Me-5-C ₂ F ₅	
Q5	5-52	3-I-4-Cl	H	i-Pr	H	NMe	3-Me-5-n-C ₃ F ₇	
Q5	5-53	3-I-4-CF ₃	H	i-Pr	H	S	3-Me-5-i-C ₃ F ₇	
Q5	5-54	3-CF ₃ -4-Cl	H	i-Pr	H	S	3-Me-5-C ₂ F ₅	
Q5	5-55	3-OCF ₂ O-4	H	i-Pr	H	S	3-Me-5-n-C ₃ F ₇	
Q5	5-56	3-OCF ₂ CF ₂ O-4	H	i-Pr	H	S	3-Me-5-i-C ₃ F ₇	
Q6	6- 1	3-Cl	H	i-Pr	H	O	H	
Q6	6- 2	3-Cl	H	i-Pr	H	O	4-Me-3-C ₂ F ₅	
Q6	6- 3	3-Cl	H	i-Pr	H	O	3,4-Br ₂	
Q6	6- 4	3-Br	H	i-Pr	H	O	4-Me-3-n-C ₃ F ₇	
Q6	6- 5	3-NO ₂	H	i-Pr	H	O	4-Me-3-i-C ₃ F ₇	

Table 3 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q6	6- 6	3-NO ₂	H	i-Pr		H NMe	3-Me	176
Q6	6- 7	3-I	H	i-Pr		H O	4-Me-3-Et	85
Q6	6- 8	3-I	H	i-Pr		H O	4-Me-3-CF ₃	103
Q6	6- 9	3-I	H	i-Pr		H S	H	
Q6	6-10	3-I	H	i-Pr		H S	4-Me	
Q6	6-11	3-I	H	i-Pr		H S	3-Cl	
Q6	6-12	3-I	H	i-Pr		H S	3-C ₂ F ₅	
Q6	6-13	3-I	H	i-Pr		H S	3-n-C ₃ F ₇	
Q6	6-14	3-I	H	i-Pr		H S	3-i-C ₃ F ₇	
Q6	6-15	3-I	H	i-Pr		H S	4-Me-3-t-Bu	
Q6	6-16	3-I	H	i-Pr		H S	4-Me-3-Br	
Q6	6-17	3-I	H	i-Pr		H S	4-Me-3-C ₂ F ₅	
Q6	6-18	3-I	H	i-Pr		H S	4-Me-3-n-C ₃ F ₇	
Q6	6-19	3-I	H	i-Pr		H S	4-Me-3-i-C ₃ F ₇	
Q6	6-20	3-I	H	t-Bu		H NMe	3-i-C ₃ F ₇	
Q6	6-21	3-I	H	t-Bu		H NMe	3-C ₂ F ₅	
Q6	6-22	3-I	H	t-Bu		H NMe	3-n-C ₃ F ₇	
Q6	6-23	3-I	H	t-Bu		H NMe	4-Me-3-i-C ₃ F ₇	
Q6	6-24	3-I	H	CH(CH ₃)CH ₂ SCH ₃		H S	4-Me-3-i-C ₃ F ₇	
Q6	6-25	3-I	H	CH(CH ₃)CH ₂ SOCH ₃		H S	4-Me-3-i-C ₃ F ₇	
Q6	6-26	3-I	H	CH(CH ₃)CH ₂ SO ₂ CH ₃		H S	4-Me-3-i-C ₃ F ₇	
Q6	6-27	3-I	H	C(CH ₃) ₂ CH ₂ SCH ₃		H S	4-Me-3-i-C ₃ F ₇	
Q6	6-28	3-I	H	C(CH ₃) ₂ CH ₂ SOCH ₃		H S	4-Me-3-i-C ₃ F ₇	

Table 3 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q6	6-29	3-I	H	C(CH ₃) ₂ CH ₂ SO ₂ CH ₃	H	S	4-Me-3-i-C ₂ F ₅	
Q6	6-30	3-I	H	CH(CH ₃)CH ₂ NHAc	H	S	4-Me-3-i-C ₂ F ₅	
Q6	6-31	3-I	H	C(CH ₃) ₂ CH ₂ NHAc	H	S	4-Me-3-i-C ₂ F ₅	
Q6	6-32	3-I	H	CH(CH ₃)CH ₂ CH ₂ OCH ₃	H	S	4-Me-3-i-C ₂ F ₅	
Q6	6-33	3-I	H	C(CH ₃) ₂ CH ₂ CH ₂ OCH ₃	H	S	4-Me-3-i-C ₂ F ₅	
Q6	6-34	3-I	Et	Et		H O	H	
Q6	6-35	3-I	Et	Et		H O	4-Me-3-C ₂ F ₅	
Q6	6-36	3-I	Et	Et		H O	4-Me-3-n-C ₂ F ₅	
Q6	6-37	3-I	Et	Et		H O	4-Me-3-i-C ₂ F ₅	
Q6	6-38	3-I	Et	Et		H O	3-Cl	
Q6	6-39	3-I	Et	Et		H O	3-Br	
Q6	6-40	3-I	Et	Et		H O	3-n-C ₂ F ₅	
Q6	6-41	3-CF ₃	H	i-Pr		H NMe	4-Me-3-C ₂ F ₅	
Q6	6-42	3-Ph	H	i-Pr		H NMe	4-Me-3-n-C ₂ F ₅	
Q6	6-43	3-SOCF ₃	H	i-Pr		H NMe	4-Me-3-i-C ₂ F ₅	
Q6	6-44	3-C ₂ F ₅	H	i-Pr		H NMe	4-Me-3-C ₂ F ₅	
Q6	6-45	3-I-4-Cl	H	i-Pr		H NMe	4-Me-3-n-C ₂ F ₅	
Q6	6-46	3-I-4-CF ₃	H	i-Pr		H S	4-Me-3-i-C ₂ F ₅	
Q6	6-47	3-CF ₃ -4-Cl	H	i-Pr		H S	4-Me-3-C ₂ F ₅	
Q6	6-48	3-OCF ₂ O-4	H	i-Pr		H S	4-Me-3-n-C ₂ F ₅	
Q6	6-49	3-OCF ₂ CF ₂ O-4	H	i-Pr		H S	4-Me-3-i-C ₂ F ₅	

Table 4 ($Z^1 = Z^2 = O$)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q8	8- 1	3-Cl	H	i-Pr	H	S	H	137
Q8	8- 2	3-Cl	H	i-Pr	H	S	4-Me	175
Q8	8- 3	3-Cl	H	i-Pr	H	S	4-CF ₃	185
Q8	8- 4	3-Cl	H	i-Pr	H	S	4-Ph	175
Q8	8- 5	3-Cl	H	i-Pr	H	S	4-Ph-5-Cl	205
Q8	8- 6	3-Cl	H	i-Pr	H	O	4-Me-5-Cl	
Q8	8- 7	3-Cl	H	i-Pr	H	O	4,5-Br ₂	
Q8	8- 8	3-Cl	H	i-Pr	H	NMe	4-Me	
Q8	8- 9	3-Cl	H	i-Pr	H	NMe	4-Me-5-CMe	
Q8	8-10	3-Cl	H	n-Pr	H	NMe	4-Me-5-CMe	
Q8	8-11	3-Cl	H	n-Pr	H	NMe	4-Me-5-OPh	
Q8	8-12	6-Cl	H	i-Pr	H	S	4-CH ₃	155
Q8	8-13	6-Cl	H	i-Pr	H	S	4-CF ₃	165
Q8	8-14	6-Cl	H	i-Pr	H	S	4-Ph	155
Q8	8-15	6-Cl	H	i-Pr	H	S	4-Ph-5-Cl	155
Q8	8-16	3-Br	H	i-Pr	H	O	4,5-Me ₂	
Q8	8-17	3-NO ₂	H	i-Pr	H	O	4,5-Me ₂	

Table 4 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q8	8-18	3-I	H	i-Pr	H	O	4-CF ₃	
Q8	8-19	3-I	H	i-Pr	H	O	5-CF ₃	
Q8	8-20	3-I	H	i-Pr	H	S	H	
Q8	8-21	3-I	H	i-Pr	H	S	4-Me	
Q8	8-22	3-I	H	i-Pr	H	S	5-Cl	
Q8	8-23	3-I	H	i-Pr	H	S	5-C ₂ F ₅	
Q8	8-24	3-I	H	i-Pr	H	S	5-n-C ₃ F ₇	
Q8	8-25	3-I	H	i-Pr	H	S	5-i-C ₃ F ₇	
Q8	8-26	3-I	H	i-Pr	H	S	4-C ₂ F ₅	
Q8	8-27	3-I	H	i-Pr	H	S	4-n-C ₃ F ₇	
Q8	8-28	3-I	H	i-Pr	H	S	4-i-C ₃ F ₇	
Q8	8-29	3-I	H	i-Pr	H	S	4-Me-5-Br	
Q8	8-30	3-I	H	i-Pr	H	S	4-Me-5-C ₂ F ₅	
Q8	8-31	3-I	H	i-Pr	H	S	4-Me-5-n-C ₃ F ₇	
Q8	8-32	3-I	H	i-Pr	H	S	4-Me-5-i-C ₃ F ₇	
Q8	8-33	3-I	H	t-Bu	H	NMe	5-i-C ₃ F ₇	
Q8	8-34	3-I	H	t-Bu	H	NMe	5-C ₂ F ₅	
Q8	8-35	3-I	H	t-Bu	H	NMe	5-n-C ₃ F ₇	
Q8	8-36	3-I	H	CH(CH ₃)CH ₂ SCH ₃	H	NMe	4, 5-Me ₂	
Q8	8-37	3-I	H	CH(CH ₃)CH ₂ SO ₂ CH ₃	H	NMe	4, 5-Me ₂	
Q8	8-38	3-I	H	CH(CH ₃)CH ₂ SOCH ₃	H	NMe	4, 5-Me ₂	
Q8	8-39	3-I	H	C(CH ₃) ₂ CH ₂ SCH ₃	H	NMe	4, 5-Me ₂	
Q8	8-40	3-I	H	C(CH ₃) ₂ CH ₂ SOCH ₃	H	NMe	4, 5-Me ₂	

Table 4 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q8	8-41	3-I	H	C(CH ₃) ₂ CH ₂ SO ₂ CH ₃	H	NMe	4, 5-Me ₂	
Q8	8-42	3-I	H	CH(CH ₃)CH ₂ NHAc	H	NMe	4, 5-Me ₂	
Q8	8-43	3-I	H	C(CH ₃) ₂ CH ₂ NHAc	H	NMe	4, 5-Me ₂	
Q8	8-44	3-I	H	CH(CH ₃)CH ₂ CH ₂ OCH ₃	H	NMe	4, 5-Me ₂	
Q8	8-45	3-I	H	C(CH ₃) ₂ CH ₂ CH ₂ OCH ₃	H	NMe	4, 5-Me ₂	
Q8	8-46	3-I	Et	Et		H O	H	
Q8	8-47	3-I	Et	Et		H O	5-C ₂ F ₅	
Q8	8-48	3-I	Et	Et		H O	4-n-C ₃ F ₇	
Q8	8-49	3-I	Et	Et		H O	4-i-C ₃ F ₇	
Q8	8-50	3-I	Et	Et		H O	5-Cl	
Q8	8-51	3-I	Et	Et		H O	5-Br	
Q8	8-52	3-I	Et	Et		H O	5-n-C ₃ F ₇	
Q8	8-53	3-I	Et	Et		H S	4-(4-Cl-Ph)	139
Q8	8-54	3-CF ₃	H	i-Pr		H NMe	5-C ₂ F ₅	
Q8	8-55	3-Ph	H	i-Pr		H NMe	4-n-C ₃ F ₇	
Q8	8-56	3-SOCF ₃	H	i-Pr		H NMe	4-i-C ₃ F ₇	
Q8	8-57	3-C ₂ F ₅	H	i-Pr		H NMe	5-C ₂ F ₅	
Q8	8-58	3-I-4-Cl	H	i-Pr		H NMe	4-n-C ₃ F ₇	
Q8	8-59	3-I-4-CF ₃	H	i-Pr		H S	4-i-C ₃ F ₇	
Q8	8-60	3-CF ₃ -4-Cl	H	i-Pr		H S	5-C ₂ F ₅	
Q8	8-61	3-OCF ₂ O-4	H	i-Pr		H S	4-n-C ₃ F ₇	
Q8	8-62	3-OCF ₂ CF ₂ O-4	H	i-Pr		H S	4-i-C ₃ F ₇	
Q8	8-63	3-I	H	i-Pr		H S	4-S-Et	86

Table 4 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q8	8-64	6-I	H	i-Pr	H	S	4-S-Et	135
Q8	8-65	3-I	H	i-Pr	H	S	4-Me-5-CO ₂ -Et	
Amorphous solid								
Q9	9- 1	3-Cl	H	i-Pr	H	O	H	
Q9	9- 2	3-Cl	H	i-Pr	H	O	5-Me-2-C ₂ F ₅	
Q9	9- 3	3-Cl	H	i-Pr	H	O	2, 5-Br ₂	
Q9	9- 4	3-Cl	H	i-Pr	H	S	2-Ph	131
Q9	9- 5	3-Br	H	i-Pr	H	O	5-Me-2-n-C ₃ F ₇	
Q9	9- 6	3-NO ₂	H	i-Pr	H	O	5-Me-2-i-C ₃ F ₇	
Q9	9- 7	3-I	H	i-Pr	H	O	5-Me-2-CF ₃	
Q9	9- 8	3-I	H	i-Pr	H	S	H	
Q9	9- 9	3-I	H	i-Pr	H	S	2-Me	
Q9	9-10	3-I	H	i-Pr	H	S	2-Cl	
Q9	9-11	3-I	H	i-Pr	H	S	2-C ₂ F ₅	
Q9	9-12	3-I	H	i-Pr	H	S	2-n-C ₃ F ₇	
Q9	9-13	3-I	H	i-Pr	H	S	2-i-C ₃ F ₇	
Q9	9-14	3-I	H	i-Pr	H	S	5-Me-2-t-Bu	
Q9	9-15	3-I	H	i-Pr	H	S	5-Me-2-I	135
Q9	9-16	3-I	H	i-Pr	H	S	5-Me-2-C ₂ F ₅	
Q9	9-17	3-I	H	i-Pr	H	S	5-Me-2-n-C ₃ F ₇	
Q9	9-18	3-I	H	i-Pr	H	S	5-Me-2-i-C ₃ F ₇	
Q9	9-19	3-I	H	i-Pr	H	S	5-Me-2-I	191
Q9	9-20	3-I	H	t-Bu	H	NMe	2-i-C ₃ F ₇	

Table 4 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q9	9-21	3-I	H	t-Bu		H NMe	2-C ₂ F ₅	
Q9	9-22	3-I	H	t-Bu		H NMe	2-n-C ₃ F ₇	
Q9	9-23	3-I	H	t-Bu		H NMe	5-Me-2-i-C ₃ F ₇	
Q9	9-24	3-I	H	CH(CH ₃)CH ₂ SCH ₃	H S		5-Me-2-i-C ₃ F ₇	
Q9	9-25	3-I	H	CH(CH ₃)CH ₂ SOCH ₃	H S		5-Me-2-i-C ₃ F ₇	
Q9	9-26	3-I	H	CH(CH ₃)CH ₂ SO ₂ CH ₃	H S		5-Me-2-i-C ₃ F ₇	
Q9	9-27	3-I	H	C(CH ₃) ₂ CH ₂ SCH ₃	H S		5-Me-2-i-C ₃ F ₇	
Q9	9-28	3-I	H	C(CH ₃) ₂ CH ₂ SOCH ₃	H S		5-Me-2-i-C ₃ F ₇	
Q9	9-29	3-I	H	C(CH ₃) ₂ CH ₂ SO ₂ CH ₃	H S		5-Me-2-i-C ₃ F ₇	
Q9	9-30	3-I	H	CH(CH ₃)CH ₂ NHAc	H S		5-Me-2-i-C ₃ F ₇	
Q9	9-31	3-I	H	C(CH ₃) ₂ CH ₂ NHAc	H S		5-Me-2-i-C ₃ F ₇	
Q9	9-32	3-I	Et	Et		H O	H	
Q9	9-33	3-I	Et	Et		H O	5-Me-2-C ₂ F ₅	
Q9	9-34	3-I	Et	Et		H O	5-Me-2-n-C ₃ F ₇	
Q9	9-35	3-I	Et	Et		H O	5-Me-2-i-C ₃ F ₇	
Q9	9-36	3-I	Et	Et		H O	2-Cl	
Q9	9-37	3-I	Et	Et		H O	2-Br	
Q9	9-38	3-I	Et	Et		H O	2-n-C ₃ F ₇	
Q9	9-39	3-CF ₃	H	i-Pr		H NMe	5-Me-2-C ₂ F ₅	
Q9	9-40	3-Ph	H	i-Pr		H NMe	5-Me-2-n-C ₃ F ₇	
Q9	9-41	3-SOCF ₃	H	i-Pr		H NMe	5-Me-2-i-C ₃ F ₇	
Q9	9-42	3-C ₂ F ₅	H	i-Pr		H NMe	5-Me-2-C ₂ F ₅	
Q9	9-43	3-I-4-Cl	H	i-Pr		H NMe	5-Me-2-n-C ₃ F ₇	

Table 4 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q9	9-44	3-I-4-CF ₃	H	i-Pr	H	S	5-Me-2-i-C ₃ F ₇	
Q9	9-45	3-CF ₃ -4-Cl	H	i-Pr	H	S	5-Me-2-C ₂ F ₅	
Q9	9-46	3-OCF ₂ O-4	H	i-Pr	H	S	5-Me-2-n-C ₃ F ₇	
Q9	9-47	3-OCF ₂ CF ₂ O-4	H	i-Pr	H	S	5-Me-2-i-C ₃ F ₇	
Q10	10-1	3-Cl	H	i-Pr	H	O	H	
Q10	10-2	3-Cl	H	i-Pr	H	O	4-Me-2-C ₂ F ₅	
Q10	10-3	3-Cl	H	i-Pr	H	O	2,4-Br ₂	
Q10	10-4	3-Cl	H	i-Pr	H	O	2-Ph	
Q10	10-5	3-Br	H	i-Pr	H	O	4-Me-2-n-C ₃ F ₇	
Q10	10-6	3-NO ₂	H	i-Pr	H	O	4-Me-2-i-C ₃ F ₇	
Q10	10-7	3-I	H	i-Pr	H	S	4-Me	230
Q10	10-8	3-I	H	i-Pr	H	O	4-Me-2-CF ₃	
Q10	10-9	3-I	H	i-Pr	H	S	H	
Q10	10-10	3-I	H	i-Pr	H	S	4-Me	
Q10	10-11	3-I	H	i-Pr	H	S	2-Cl	
Q10	10-12	3-I	H	i-Pr	H	S	2-C ₂ F ₅	
Q10	10-13	3-I	H	i-Pr	H	S	2-n-C ₃ F ₇	
Q10	10-14	3-I	H	i-Pr	H	S	2-i-C ₃ F ₇	
Q10	10-15	3-I	H	i-Pr	H	S	4-Me-2-t-Bu	
Q10	10-16	3-I	H	i-Pr	H	S	4-Me-2-I	
Q10	10-17	3-I	H	i-Pr	H	S	4-Me-2-C ₂ F ₅	
Q10	10-18	3-I	H	i-Pr	H	S	4-Me-2-n-C ₃ F ₇	
Q10	10-19	3-I	H	i-Pr	H	S	4-Me-2-i-C ₃ F ₇	

Table 4 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q10	10-20	6-I	H	i-Pr		H S	4-Me	198
Q10	10-21	3-I	H	t-Bu		H NMe	2-i-C ₃ F ₇	
Q10	10-22	3-I	H	t-Bu		H NMe	2-C ₂ F ₅	
Q10	10-23	3-I	H	t-Bu		H NMe	2-n-C ₃ F ₇	
Q10	10-24	3-I	H	t-Bu		H NMe	4-Me-2-i-C ₃ F ₇	
Q10	10-25	3-I	H	CH(CH ₃)CH ₂ SCH ₃		H S	4-Me-2-i-C ₃ F ₇	
Q10	10-26	3-I	H	CH(CH ₃)CH ₂ SOCH ₃		H S	4-Me-2-i-C ₃ F ₇	
Q10	10-27	3-I	H	CH(CH ₃)CH ₂ SO ₂ CH ₃		H S	4-Me-2-i-C ₃ F ₇	
Q10	10-28	3-I	H	C(CH ₃) ₂ CH ₂ SCH ₃		H S	4-Me-2-i-C ₃ F ₇	
Q10	10-29	3-I	H	C(CH ₃) ₂ CH ₂ SOCH ₃		H S	4-Me-2-i-C ₃ F ₇	
Q10	10-30	3-I	H	C(CH ₃) ₂ CH ₂ SO ₂ CH ₃		H S	4-Me-2-i-C ₃ F ₇	
Q10	10-31	3-I	H	CH(CH ₃)CH ₂ NHAC		H S	4-Me-2-i-C ₃ F ₇	
Q10	10-32	3-I	H	C(CH ₃) ₂ CH ₂ NHAC		H S	4-Me-2-i-C ₃ F ₇	
Q10	10-33	3-I	Et	Et		H O	H	
Q10	10-34	3-I	Et	Et		H O	4-Me-2-C ₂ F ₅	
Q10	10-35	3-I	Et	Et		H O	4-Me-2-n-C ₃ F ₇	
Q10	10-36	3-I	Et	Et		H O	4-Me-2-i-C ₃ F ₇	
Q10	10-37	3-I	Et	Et		H O	2-Cl	
Q10	10-38	3-I	Et	Et		H O	2-Br	
Q10	10-39	3-I	Et	Et		H O	2-n-C ₃ F ₇	
Q10	10-40	3-CF ₃	H	i-Pr		H NMe	4-Me-2-C ₂ F ₅	
Q10	10-41	3-Ph	H	i-Pr		H NMe	4-Me-2-n-C ₃ F ₇	
Q10	10-42	3-SOCF ₃	H	i-Pr		H NMe	4-Me-2-i-C ₃ F ₇	

Table 4 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q10	10-43	3-C ₂ F ₅	H	i-Pr	H	NMe	4-Me-2-C ₂ F ₅	
Q10	10-44	3-I-4-Cl	H	i-Pr	H	NMe	4-Me-2-n-C ₃ F ₇	
Q10	10-45	3-I-4-CF ₃	H	i-Pr	H	S	4-Me-2-i-C ₃ F ₇	
Q10	10-46	3-CF ₃ -4-Cl	H	i-Pr	H	S	4-Me-2-C ₂ F ₅	
Q10	10-47	3-OCF ₂ O-4	H	i-Pr	H	S	4-Me-2-n-C ₃ F ₇	
Q10	10-48	3-OCP(CF ₃) ₂ O-4	H	i-Pr	H	S	4-Me-2-i-C ₃ F ₇	

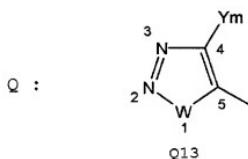
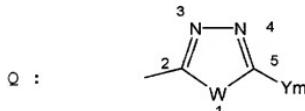


Table 5 ($Z^1 = Z^2 = O$)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q13	13- 1	3-Cl	H	i-Pr	H	S	4-Me	
Q13	13- 2	3-Cl	H	i-Pr	H	O	4-Me	
Q13	13- 3	3-Cl	H	i-Pr	H	NMe	4-Me	
Q13	13- 4	3-I	H	i-Pr	H	S	H	
Q13	13- 5	3-I	H	i-Pr	H	S	4-Me	60
Q13	13- 6	3-I	H	i-Pr	H	S	4-Cl	
Q13	13- 7	3-I	H	i-Pr	H	S	4-CF ₃	
Q13	13- 8	3-I	H	i-Pr	H	S	4-C ₂ F ₅	
Q13	13- 9	3-I	H	i-Pr	H	S	4-n-C ₃ F ₇	
Q13	13-10	3-I	H	i-Pr	H	S	4-i-C ₃ F ₇	
Q13	13-11	3-I	H	i-Pr	H	S	4-t-Bu	
Q13	13-12	6-I	H	i-Pr	H	S	4-Me	73
Q13	13-13	3-I	H	CH(CH ₃)CH ₂ SCH ₃	H	S	4-CF ₃	
Q13	13-14	3-I	H	CH(CH ₃)CH ₂ SOCH ₃	H	S	4-CF ₃	
Q13	13-15	3-I	H	CH(CH ₃)CH ₂ SO ₂ CH ₃	H	S	4-CF ₃	
Q13	13-16	3-I	H	C(CH ₃) ₂ CH ₂ SCH ₃	H	S	4-CF ₃	
Q13	13-17	3-I	H	C(CH ₃) ₂ CH ₂ SOCH ₃	H	S	4-CF ₃	
Q13	13-18	3-I	H	C(CH ₃) ₂ CH ₂ SO ₂ CH ₃	H	S	4-CF ₃	
Q13	13-19	3-I	H	CH(CH ₃)CH ₂ NHAc	H	S	4-CF ₃	
Q13	13-20	3-I	H	C(CH ₃) ₂ CH ₂ NHAc	H	S	4-CF ₃	
Q13	13-21	3-I	H	CH(CH ₃)CH ₂ CH ₂ OCH ₃	H	S	4-CF ₃	
Q13	13-22	3-I	H	C(CH ₃) ₂ CH ₂ CH ₂ OCH ₃	H	S	4-CF ₃	
Q13	13-23	3-I	Et	Et	H	S	H	

Table 5 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q13	13-24	3-I	Et	Et	H	S	4-CF ₃	
Q13	13-25	3-I	Et	Et	H	S	4-CF ₃	
Q13	13-26	3-I	Et	Et	H	S	4-CF ₃	
Q13	13-27	3-I	Et	Et	H	S	4-CF ₃	
Q13	13-28	3-CF ₃	H	i-Pr	H	S	3-n-C ₂ F ₅	
Q13	13-29	3-Ph	H	i-Pr	H	S	3-n-C ₂ F ₅	
Q13	13-30	3-SOCF ₃	H	i-Pr	H	S	3-i-C ₂ F ₅	
Q13	13-31	3-C ₂ F ₅	H	i-Pr	H	S	3-C ₂ F ₅	
Q13	13-32	3-I-4-Cl	H	i-Pr	H	S	3-n-C ₂ F ₅	
Q13	13-33	3-I-4-CF ₃	H	i-Pr	H	S	3-i-C ₂ F ₅	
Q13	13-34	3-CF ₃ -4-Cl	H	i-Pr	H	S	3-C ₂ F ₅	
Q13	13-35	3-OCECF ₂ O-4	H	i-Pr	H	S	3-n-C ₂ F ₅	
Q13	13-36	3-OCF ₂ CF ₂ O-4	H	i-Pr	H	S	3-i-C ₂ F ₅	



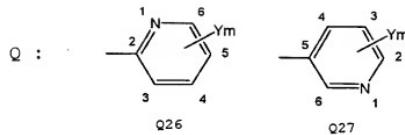
Q19

Table 6 ($Z^1 = Z^2 = O$)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q19	19- 1	3-Cl	H i-Pr		H O	H		
Q19	19- 2	3-Cl	H i-Pr		H O	5-C ₂ F ₅		
Q19	19- 3	3-Cl	H i-Pr		H S	5-Me	166	
Q19	19- 4	3-Br	H i-Pr		H O	5-n-C ₃ F ₇		
Q19	19- 5	3-NO ₂	H i-Pr		H O	5-i-C ₃ F ₇		
Q19	19- 6	3-I	H i-Pr		H S	H		
Q19	19- 7	3-I	H i-Pr		H S	5-Me		
Q19	19- 8	3-I	H i-Pr		H S	5-Cl		
Q19	19- 9	3-I	H i-Pr		H S	5-CF ₃	104	
Q19	19-10	3-I	H i-Pr		H S	5-C ₂ F ₅		
Q19	19-11	3-I	H i-Pr		H S	5-n-C ₃ F ₇		
Q19	19-12	3-I	H i-Pr		H S	5-i-C ₃ F ₇		
Q19	19-13	3-I	H i-Pr		H S	5-t-Bu		
Q19	19-14	3-I	H i-Pr		H S	5-CF ₃	176	
Q19	19-15	3-I	H t-Bu		H NMe	5-i-C ₃ F ₇		
Q19	19-16	3-I	H t-Bu		H NMe	5-C ₂ F ₅		
Q19	19-17	3-I	H t-Bu		H NMe	5-n-C ₃ F ₇		
Q19	19-18	3-I	H t-Bu		H NMe	5-CF ₃		
Q19	19-19	3-I	H CH(CH ₃)CH ₂ SCH ₃		H S	5-i-C ₃ F ₇		
Q19	19-20	3-I	H CH(CH ₃)CH ₂ SOCH ₃		H S	5-i-C ₃ F ₇		
Q19	19-21	3-I	H CH(CH ₃)CH ₂ SO ₂ CH ₃		H S	5-i-C ₃ F ₇		
Q19	19-22	3-I	H C(CH ₃) ₂ CH ₂ SCH ₃		H S	5-i-C ₃ F ₇		
Q19	19-23	3-I	H C(CH ₃) ₂ CH ₂ SOCH ₃		H S	5-i-C ₃ F ₇		

Table 6 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	mp (°C)
Q19	19-24	3-I	H	C(CH ₃) ₂ CH ₂ SO ₂ CH ₃	H	S	5-i-C ₃ F ₇	
Q19	19-25	3-I	H	CH(CH ₃)CH ₂ NHAc	H	S	5-i-C ₃ F ₇	
Q19	19-26	3-I	H	C(CH ₃) ₂ CH ₂ NHTAc	H	S	5-i-C ₃ F ₇	
Q19	19-27	3-I	H	CH(CH ₃)CH ₂ CH ₂ OCH ₃	H	S	5-i-C ₃ F ₇	
Q19	19-28	3-I	H	C(CH ₃) ₂ CH ₂ CH ₂ OCH ₃	H	S	5-i-C ₃ F ₇	
Q19	19-29	3-I	Et	Et		H O	H	
Q19	19-30	3-I	Et	Et		H O	5-C ₂ F ₅	
Q19	19-31	3-I	Et	Et		H O	5-n-C ₃ F ₇	
Q19	19-32	3-I	Et	Et		H O	5-i-C ₃ F ₇	
Q19	19-33	3-I	Et	Et		H O	5-Cl	
Q19	19-34	3-I	Et	Et		H S	5-t-Bu	59
Q19	19-35	3-CF ₃	H	i-Pr		H NMe	5-C ₂ F ₅	
Q19	19-36	3-Ph	H	i-Pr		H NMe	5-n-C ₃ F ₇	
Q19	19-37	3-SOCF ₃	H	i-Pr		H NMe	5-i-C ₃ F ₇	
Q19	19-38	3-C ₂ F ₅	H	i-Pr		H NMe	5-C ₂ F ₅	
Q19	19-39	3-I-4-Cl	H	i-Pr		H NMe	5-n-C ₃ F ₇	
Q19	19-40	3-I-4-CF ₃	H	i-Pr		H S	5-i-C ₃ F ₇	
Q19	19-41	3-CF ₃ -4-Cl	H	i-Pr		H S	5-C ₂ F ₅	
Q19	19-42	3-OCF ₂ O-4	H	i-Pr		H S	5-n-C ₃ F ₇	
Q19	19-43	3-OCF ₂ CF ₂ O-4	H	i-Pr		H S	5-i-C ₃ F ₇	

Table 7 ($Z^1 = Z^2 = O$)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q26	26-1	H	H	i-Pr	H	3-Cl-5-CF ₃	85
Q26	26-2	3-Cl	H	i-Pr	H	H	
Q26	26-3	3-Cl	H	i-Pr	H	3-Me-5-C ₂ F ₅	
Q26	26-4	3-Br	H	i-Pr	H	3-Me-5-n-C ₃ F ₇	
Q26	26-5	3-NO ₂	H	i-Pr	H	3-Me-5-i-C ₃ F ₇	
Q26	26-6	3-I	H	i-Pr	H	5-C ₂ F ₅	
Q26	26-7	3-I	H	i-Pr	H	5-n-C ₃ F ₇	
Q26	26-8	3-I	H	i-Pr	H	5-i-C ₃ F ₇	
Q26	26-9	3-I	H	i-Pr	H	3-Me-5-C ₂ F ₅	
Q26	26-10	3-I	H	i-Pr	H	3-Me-5-n-C ₃ F ₇	
Q26	26-11	3-I	H	i-Pr	H	3-Me-5-i-C ₃ F ₇	140
Q26	26-12	3-I	H	i-Pr	H	3-Me-4-C ₂ F ₅	
Q26	26-13	3-I	H	i-Pr	H	3-Me-4-n-C ₃ F ₇	
Q26	26-14	3-I	H	i-Pr	H	3-Me-4-i-C ₃ F ₇	
Q26	26-15	3-I	H	t-Bu	H	5-i-C ₃ F ₇	
Q26	26-16	3-I	H	t-Bu	H	5-C ₂ F ₅	

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q26	26-17	3-I	H	t-Bu		H 5-n-C ₂ F ₇	
Q26	26-18	3-I	H	t-Bu		H 3-Me-5-i-C ₃ F ₇	
Q26	26-19	3-I	H	CH(CH ₃)CH ₂ SCH ₃		H 3-Me-5-i-C ₃ F ₇	
Q26	26-20	3-I	H	CH(CH ₃)CH ₂ SOCH ₃		H 3-Me-5-i-C ₃ F ₇	
Q26	26-21	3-I	H	CH(CH ₃)CH ₂ SO ₂ CH ₃		H 3-Me-5-i-C ₃ F ₇	
Q26	26-22	3-I	H	C(CH ₃) ₂ CH ₂ SCH ₃		H 3-Me-5-i-C ₃ F ₇	
Q26	26-23	3-I	H	C(CH ₃) ₂ CH ₂ SOCH ₃		H 3-Me-5-i-C ₃ F ₇	
Q26	26-24	3-I	H	C(CH ₃) ₂ CH ₂ SO ₂ CH ₃		H 3-Me-5-i-C ₃ F ₇	
Q26	26-25	3-I	H	CH(CH ₃)CH ₂ SET		H 3-Me-5-i-C ₃ F ₇	
Q26	26-26	3-I	H	C(CH ₃)CH ₂ SEt		H 3-Me-5-i-C ₃ F ₇	
Q26	26-27	3-I	H	CH(CH ₃)CH ₂ CH ₂ SCH ₃		H 3-Me-5-i-C ₃ F ₇	
Q26	26-28	3-I	H	CH(CH ₃) ₂ CH ₂ CH ₂ SCH ₃		H 3-Me-5-i-C ₃ F ₇	
Q26	26-29	3-I	Et	Et		H 3-Me-5-C ₂ F ₅	Paste
Q26	26-30	3-I	Et	Et		H 3-Me-5-n-C ₃ F ₇	Paste
Q26	26-31	3-I	Et	Et		H 3-Me-5-i-C ₃ F ₇	159
Q26	26-32	3-I	Et	Et		H 5-Cl	127
Q26	26-33	3-I	Et	Et		H 5-Br	154
Q26	26-34	3-CF ₃	H	i-Pr		H 3-Me-5-C ₂ F ₅	
Q26	26-35	3-Ph	H	i-Pr		H 3-Me-5-n-C ₃ F ₇	
Q26	26-36	3-SOCF ₃	H	i-Pr		H 3-Me-5-i-C ₃ F ₇	
Q26	26-37	3-C ₂ F ₅	H	i-Pr		H 3-Me-5-C ₂ F ₅	
Q26	26-38	3-I-4-Cl	H	i-Pr		H 3-Me-5-n-C ₃ F ₇	
Q26	26-39	3-I-4-CF ₃	H	i-Pr		H 3-Me-5-i-C ₃ F ₇	

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q26	26-40	3-CF ₃ -4-Cl	H	i-Pr	H	3-Me-5-C ₂ F ₅	
Q26	26-41	3-OCF ₂ O-4	H	i-Pr	H	3-Me-5-n-C ₃ F ₇	
Q26	26-42	3-OCF ₂ CF ₃ O-4	H	i-Pr	H	3-Me-5-i-C ₃ F ₇	
Q26	26-43	3-I	H	i-Pr	H	3-Me-5-i-C ₃ F ₇	140
Q27	27- 1	H	H	i-Pr	H	H	139
Q27	27- 2	H	H	i-Pr	H	2-Me	
Q27	27- 3	H	H	i-Pr	H	3-Me	
Q27	27- 4	H	H	i-Pr	H	4-Me	
Q27	27- 5	H	H	i-Pr	H	6-Me	
Q27	27- 6	H	H	i-Pr	H	2-Cl	
Q27	27- 7	H	H	i-Pr	H	3-Cl	
Q27	27- 8	H	H	i-Pr	H	4-Cl	
Q27	27- 9	H	H	i-Pr	H	6-Cl	
Q27	27-10	3-Cl	H	i-Pr	H	2-CF ₃	
Q27	27-11	3-Cl	H	i-Pr	H	3-CF ₃	
Q27	27-12	3-Cl	H	i-Pr	H	4-CF ₃	
Q27	27-13	3-Cl	H	i-Pr	H	6-CF ₃	
Q27	27-14	3-Cl	H	i-Pr	H	2-NO ₂	
Q27	27-15	3-Cl	H	i-Pr	H	3-NO ₂	
Q27	27-16	3-Cl	H	i-Pr	H	4-NO ₂	
Q27	27-17	3-Cl	H	i-Pr	H	6-NO ₂	
Q27	27-18	3-Cl	H	i-Pr	H	2-Et	
Q27	27-19	3-Cl	H	i-Pr	H	2-i-Pr	

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-20	3-Cl	H	i-Pr	H	2-t-Bu	
Q27	27-21	3-Cl	H	i-Pr	H	2-SCH ₃	
Q27	27-22	3-Cl	H	i-Pr	H	2-SOCH ₃	
Q27	27-23	3-Cl	H	i-Pr	H	2-SO ₂ CH ₃	
Q27	27-24	3-Cl	H	i-Pr	H	2-SCF ₃	
Q27	27-25	3-Cl	H	i-Pr	H	2-SCHF ₂	
Q27	27-26	3-Cl	H	i-Pr	H	2-COCH ₃	
Q27	27-27	3-Cl	H	i-Pr	H	2-CN	
Q27	27-28	3-Cl	H	i-Pr	H	2-OCH ₃	
Q27	27-29	3-Cl	H	i-Pr	H	2-O-(4-Br-Ph)	101
Q27	27-30	3-Cl	H	i-Pr	H	2-O-(2,4-Cl ₂ -Ph)	97
Q27	27-31	3-Cl	H	i-Pr	H	4-S-i-Pr	193
Q27	27-32	3-Cl	H	i-Pr	H	4-S-i-Bu	183
Q27	27-33	3-Cl	H	i-Pr	H	2-OCF ₂ CCl ₂ F	
Q27	27-34	3-Cl	H	i-Pr	H	2-OCH ₂ CF ₃	
Q27	27-35	3-Cl	H	i-Pr	H	2-OCH ₂ CF ₂ CHF ₂	
Q27	27-36	3-Cl	H	i-Pr	H	2-CF ₂ CF ₃	
Q27	27-37	3-Cl	H	i-Pr	H	2-COOCH(CF ₃) ₂	
Q27	27-38	3-Cl	H	i-Pr	H	2-Ph	
Q27	27-39	3-Cl	H	n-Bu	H	2-Cl	
Q27	27-40	3-Cl	H	i-Bu	H	2-Cl	
Q27	27-41	3-Cl	H	s-Bu	H	2-Cl	
Q27	27-42	3-Cl	H	t-Bu	H	2-Cl	

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-43	3-Cl	H	C-C ₂ H ₅	H	2-Cl	
Q27	27-44	3-Cl	H	C-C ₂ H ₇	H	2-Cl	
Q27	27-45	3-Cl	H	C-C ₂ H ₉	H	2-Cl	
Q27	27-46	3-Cl	H	C-C ₂ H ₁₁	H	2-Cl	
Q27	27-47	3-Cl	H	CH ₂ CH=CH ₂	H	2-Cl	
Q27	27-48	3-Cl	H	CH ₂ C≡CH	H	2-Cl	
Q27	27-49	3-Cl	H	CH ₂ Ph	H	2-Cl	
Q27	27-50	3-Cl	H	C(CH ₃) ₂ C≡CH	H	2-Cl	
Q27	27-51	3-Cl	H	C(CH ₃) ₂ C≡CPh	H	2-Cl	
Q27	27-52	3-Cl	H	CH ₂ CH ₂ SCH ₃	H	2-Cl	
Q27	27-53	3-Cl	H	CH ₂ CH ₂ SPh	H	2-Cl	
Q27	27-54	3-Cl	H	CH ₂ CH ₂ SO ₂ Ph	H	2-Cl	
Q27	27-55	3-Cl	H	CH ₂ CH ₂ SO ₂ CH ₃	H	2-Cl	
Q27	27-56	3-Cl	H	CH ₂ CH ₂ CO ₂ CH ₃	H	2-Cl	
Q27	27-57	3-Cl	H	CH ₂ CH ₂ CONHCH ₃	H	2-Cl	
Q27	27-58	3-Cl	Et	Et	H	2-Cl	
Q27	27-59	3-Cl	n-Pr	n-Pr	H	2-Cl	
Q27	27-60	3-Cl	i-Pr	i-Pr	H	2-Cl	
Q27	27-61	3-Cl	i-Pr	Me	H	2-Cl	
Q27	27-62	3-Cl	i-Bu	Me	H	2-Cl	
Q27	27-63	3-Cl	CH ₂ CH=CH ₂	CH ₂ CH=CH ₂	H	2-Cl	
Q27	27-64	3-Cl	Et	Et	Me	2-Cl	
Q27	27-65	3-Cl	n-Pr	i-Pr	Me	2-Cl	

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-66	3-Cl	i-Pr	i-Pr		Me	2-Cl
Q27	27-67	3-Cl	Et	Et		Ac	2-Cl
Q27	27-68	3-Cl	n-Pr	i-Pr		Ac	2-Cl
Q27	27-69	3-Cl	i-Pr	i-Pr		Ac	2-Cl
Q27	27-70	3-Cl		- (CH ₂) ₄ -		H	2-Cl
Q27	27-71	3-Cl		- (CH ₂) ₂ O(CH ₂) ₂ -		H	2-Cl
Q27	27-72	3-Cl	i-Pr	SO ₂ CH ₃		H	2-Cl
Q27	27-73	3-Cl	i-Pr	CN		H	2-Cl
Q27	27-74	3-Cl	i-Pr	CO ₂ CH ₃		H	2-Cl
Q27	27-75	3-Cl	i-Pr	COCH ₃		H	2-Cl
Q27	27-76	3-Cl	i-Pr	COPh		H	2-Cl
Q27	27-77	3-Cl	i-Pr	NHCOCH ₃		H	2-Cl
Q27	27-78	3-Cl	H	i-Pr		H	2,4-Me ₂
Q27	27-79	3-Cl	H	i-Pr		H	2,4-Cl ₂
Q27	27-80	3-Cl	H	i-Pr		H	4,6-Me ₂
Q27	27-81	3-Cl	H	i-Pr		H	4-Me-2-Cl
Q27	27-82	3-Cl	H	i-Pr		H	4-Me-2-F
Q27	27-83	3-Cl	H	i-Pr		H	4-Me-2-Br
Q27	27-84	3-Cl	H	i-Pr		H	4-Me-2-I
Q27	27-85	3-Cl	H	i-Pr		H	4-Me-2-OCHF ₂
Q27	27-86	3-Cl	H	i-Pr		H	4-Me-2-OCF ₃
Q27	27-87	3-Cl	H	i-Pr		H	4-Me-2-NO ₂
Q27	27-88	3-Cl	H	i-Pr		H	4-Me-2-NMe ₂

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Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-89	3-Cl	H	i-Pr	H	4-Me-2-C≡CH	
Q27	27-90	3-Cl	H	i-Pr	H	4-Me-2-C≡C-t-Bu	
Q27	27-91	3-Cl	H	i-Pr	H	4-Me-2-C≡CPh	
Q27	27-92	3-Cl	H	i-Pr	H	4-Me-2-CF ₂ CF ₃	
Q27	27-93	3-Cl	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	
Q27	27-94	3-Cl	H	i-Pr	H	4-Me-2-n-C ₃ F ₇	
Q27	27-95	3-Cl	H	i-Pr	H	4-Me-2-OCH ₂ OCH ₃	
Q27	27-96	3-Cl	H	i-Pr	H	4-Me-2-OCH ₂ CHF ₂	
Q27	27-97	3-Cl	H	i-Pr	H	4-Me-2-OPh	
Q27	27-98	3-Cl	H	i-Pr	H	4-Me-2-O-(4-Br-Ph)	79
Q27	27-99	3-Cl	H	i-Pr	H	4-Me-2-OSO ₂ Ph	
Q27	27-100	3-Cl	H	i-Pr	H	4-Me-2-OCH ₂ CO ₂ CH ₃	
Q27	27-101	3-Cl	H	i-Pr	H	4-Me-2-CO ₂ CH ₃	
Q27	27-102	3-Cl	H	i-Pr	H	4-Me-2-S-i-Pr	
Q27	27-103	3-Cl	H	i-Pr	H	4-Me-2-SCHF ₂	
Q27	27-104	3-Cl	H	i-Pr	H	4-Me-2-SOCHF ₂	
Q27	27-105	3-Cl	H	i-Pr	H	4-Me-2-SO ₂ CHF ₂	
Q27	27-106	3-Cl	H	i-Pr	H	4-Cl-2-CF ₃	
Q27	27-107	3-Cl	H	i-Pr	H	4-Cl-2-OCF ₃	
Q27	27-108	3-Cl	H	i-Pr	H	4-Cl-2-i-C ₃ F ₇	
Q27	27-109	3-Cl	H	i-Pr	H	4-Cl-2-C ₂ F ₅	
Q27	27-110	3-Cl	H	i-Pr	H	4-Cl-2-OCHF ₂	
Q27	27-111	3-Cl	H	i-Pr	H	4-Cl-2-OSO ₂ Ph	

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-112	3-Cl	H	i-Pr	H	4-OCH ₃ -2-Ph	
Q27	27-113	3-Cl	H	i-Pr	H	4-CF ₃ -2-Cl	
Q27	27-114	3-Cl	H	i-Pr	H	4-Me-3-CF ₃	
Q27	27-115	3-Cl	H	i-Pr	H	4-Me-3-Cl	
Q27	27-116	3-Cl	H	i-Pr	H	4-Me-3-OCF ₃	
Q27	27-117	3-Cl	H	i-Pr	H	4-Me-3-CF ₃ CF ₃	
Q27	27-118	3-Cl	H	i-Pr	H	4-Me-3-n-C ₃ F ₇	
Q27	27-119	3-Cl	H	i-Pr	H	4-Me-3-i-C ₃ F ₇	
Q27	27-120	3-Cl	H	i-Pr	H	3,4-Me ₂ -2-Cl	
Q27	27-121	3-Cl	H	i-Pr	H	3,4-Me ₂ -2-OMe	
Q27	27-122	3-Cl	H	i-Pr	H	3,4-Me ₂ -2-SMe	
Q27	27-123	3-Cl	H	i-Pr	H	4-Me-2,3-Cl ₂	
Q27	27-124	6-Cl	H	i-Pr	H	2-O-(4-Br-Ph)	170
Q27	27-125	6-Cl	H	i-Pr	H	2-O-(2,4-Cl ₂ -Ph)	189
Q27	27-126	6-Cl	H	i-Pr	H	2-S-i-Pr	120
Q27	27-127	6-Cl	H	i-Pr	H	2-S-i-Bu	187
Q27	27-128	6-Cl	H	i-Pr	H	4-Me-2-Cl	230
Q27	27-129	3-I	Et	Et	H	6-Cl-2-n-C ₃ F ₇	122
Q27	27-130	3-I	Et	Et	H	2-Cl	203
Q27	27-131	3-I	Et	Et	H	2-n-C ₃ F ₇	200
Q27	27-132	3-I	Et	Et	H	2-O-(4-Br-Ph)	247
Q27	27-133	3-I	H	i-Pr	H	2-Cl	215
Q27	27-134	3-I	H	i-Pr	H	2-C ₂ F ₅	Amorphous solid

Table 7 (Continued)

O	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-135	3-I	H i-Pr		H 2-n-C ₃ F ₇		200
Q27	27-136	3-I	H i-Pr		H 2-i-C ₃ F ₇		270
Q27	27-137	3-I	H i-Pr		H 4-Me-2-i-C ₃ F ₇		257
Q27	27-138	3-I	H i-Pr		H 6-Me-2-i-C ₃ F ₇		234
Q27	27-139	3-I	H t-Bu		H 2-i-C ₃ F ₇		275
Q27	27-140	3-I	H t-Bu		H 2-C ₂ F ₅		260
Q27	27-141	3-I	H t-Bu		H 2-n-C ₃ F ₇		245
Q27	27-142	3-I	H t-Bu		H 4-Me-2-i-C ₃ F ₇		250
Q27	27-143	3-I	H t-Bu		H 6-Me-2-i-C ₃ F ₇		246
Q27	27-144	3-I	H CH(CH ₃)CH ₂ SCH ₃		H 4-Me-2-i-C ₃ F ₇		225
Q27	27-145	3-I	H CH(CH ₃)CH ₂ SCH ₃		H 6-Me-2-i-C ₃ F ₇		229
Q27	27-146	3-I	H CH(CH ₃)CH ₂ SOCH ₃		H 4-Me-2-i-C ₃ F ₇		
Q27	27-147	3-I	H CH(CH ₃)CH ₂ SOCH ₃		H 6-Me-2-i-C ₃ F ₇		
Q27	27-148	3-I	H CH(CH ₃)CH ₂ SO ₂ CH ₃		H 4-Me-2-i-C ₃ F ₇		
Q27	27-149	3-I	H CH(CH ₃)CH ₂ SO ₂ CH ₃		H 6-Me-2-i-C ₃ F ₇		
Q27	27-150	3-I	H C(CH ₃) ₂ CH ₂ SCH ₃		H 4-Me-2-i-C ₃ F ₇		173
Q27	27-151	3-I	H C(CH ₃) ₂ CH ₂ SCH ₃		H 6-Me-2-i-C ₃ F ₇		213
Q27	27-152	3-I	H C(CH ₃) ₂ CH ₂ SOCH ₃		H 4-Me-2-i-C ₃ F ₇		
Q27	27-153	3-I	H C(CH ₃) ₂ CH ₂ SOCH ₃		H 6-Me-2-i-C ₃ F ₇	Amorphous	
Q27	27-154	3-I	H C(CH ₃) ₂ CH ₂ SO ₂ CH ₃		H 4-Me-2-i-C ₃ F ₇		
Q27	27-155	3-I	H C(CH ₃) ₂ CH ₂ SO ₂ CH ₃		H 6-Me-2-i-C ₃ F ₇		
Q27	27-156	3-I	H i-Pr		H 4-Me-2-i-C ₃ F ₇		
Q27	27-157	3-I	H t-Bu		H 6-Me-2-i-C ₃ F ₇		

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-158	3-F	H	C(CH ₃) ₂ CH ₂ SCH ₃	H	4-Me-2-i-C ₃ F ₇	
Q27	27-159	3-F	H	C(CH ₃) ₂ CH ₂ SCH ₃	H	6-Me-2-i-C ₃ F ₇	
Q27	27-160	3-Br	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	
Q27	27-161	3-Br	H	t-Bu	H	6-Me-2-i-C ₃ F ₇	
Q27	27-162	3-Br	H	CH(CH ₃)CH ₂ SCH ₃	H	4-Me-2-i-C ₃ F ₇	
Q27	27-163	3-Br	H	C(CH ₃) ₂ CH ₂ SCH ₃	H	6-Me-2-i-C ₃ F ₇	
Q27	27-164	3-NO ₂	H	i-Pr	H	H	209
Q27	27-165	3-NO ₂	H	i-Pr	H	4-Me-2-CF ₂ CF ₃	
Q27	27-166	3-NO ₂	H	i-Pr	H	4-Me-2-n-C ₃ F ₇	
Q27	27-167	3-NO ₂	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	
Q27	27-168	3-NO ₂	H	i-Pr	H	6-Me-2-CF ₂ CF ₃	
Q27	27-169	3-NO ₂	H	i-Pr	H	6-Me-2-n-C ₃ F ₇	
Q27	27-170	3-NO ₂	H	i-Pr	H	6-Me-2-i-C ₃ F ₇	
Q27	27-171	3-NO ₂	H	i-Pr	H	4-Me-2-Cl	
Q27	27-172	3-CN	Et	Et	H	4-Me-2-CF ₂ CF ₃	
Q27	27-173	3-CN	Et	Et	H	4-Me-2-n-C ₃ F ₇	
Q27	27-174	3-CN	Et	Et	H	4-Me-2-i-C ₃ F ₇	
Q27	27-175	3-CN	Et	Et	H	6-Me-2-CF ₂ CF ₃	
Q27	27-176	3-CN	Et	Et	H	6-Me-2-n-C ₃ F ₇	
Q27	27-177	3-CN	Et	Et	H	6-Me-2-i-C ₃ F ₇	
Q27	27-178	3-CN	Et	Et	H	4-Me-2-Cl	
Q27	27-179	3-CF ₃	H	i-Pr	H	4-Me-2-CF ₂ CF ₃	
Q27	27-180	3-CF ₃	H	i-Pr	H	6-Me-2-n-C ₃ F ₇	

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-181	3-OCH ₃	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	
Q27	27-182	3-OCH ₃	H	i-Pr	H	6-Me-2-CF ₂ CF ₃	
Q27	27-183	3-OCH ₃	H	i-Pr	H	4-Me-2-n-C ₃ F ₇	
Q27	27-184	3-OCH ₃	H	i-Pr	H	6-Me-2-i-C ₃ F ₇	
Q27	27-185	3-SCH ₃	H	i-Pr	H	4-Me-2-CF ₂ CF ₃	
Q27	27-186	3-SCH ₃	H	i-Pr	H	6-Me-2-n-C ₃ F ₇	
Q27	27-187	3-S-i-Pr	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	
Q27	27-188	3-S-i-Pr	H	i-Pr	H	6-Me-2-CF ₂ CF ₃	
Q27	27-189	3-SOCH ₃	H	i-Pr	H	4-Me-2-n-C ₃ F ₇	
Q27	27-190	3-SOCH ₃	H	i-Pr	H	6-Me-2-i-C ₃ F ₇	
Q27	27-191	3-SO ₂ CH ₃	H	i-Pr	H	4-Me-2-CF ₂ CF ₃	
Q27	27-192	3-SO ₂ CH ₃	H	i-Pr	H	6-Me-2-n-C ₃ F ₇	
Q27	27-193	3-SCH ₂ CF ₃	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	
Q27	27-194	3-SCF ₃	H	i-Pr	H	4-Me-2-CF ₂ CF ₃	
Q27	27-195	3-SOCF ₃	H	i-Pr	H	4-Me-2-n-C ₃ F ₇	
Q27	27-196	3-SO ₂ CF ₃	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	
Q27	27-197	3-SPh	H	i-Pr	H	6-Me-2-CF ₂ CF ₃	
Q27	27-198	3-SOPh	H	i-Pr	H	6-Me-2-n-C ₃ F ₇	
Q27	27-199	3-SO ₂ Ph	H	i-Pr	H	6-Me-2-i-C ₃ F ₇	
Q27	27-200	3-OPh	H	i-Pr	H	4-Me-2-CF ₂ CF ₃	
Q27	27-201	3-Ph	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	
Q27	27-202	3-C≡CH	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	
Q27	27-203	3-C≡C-t-Bu	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-204	3-C≡CPh	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	
Q27	27-205	3-C ₂ F ₅	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	
Q27	27-206	3-CO ₂ CH ₃	H	i-Pr	H	6-Me-2-i-C ₃ F ₇	
Q27	27-207	3-C(=O)NHCH ₃	H	i-Pr	H	6-Me-2-i-C ₃ F ₇	
Q27	27-208	3-COCH ₃	H	i-Pr	H	6-Me-2-i-C ₃ F ₇	
Q27	27-209	3-C(=O)CH ₃ (=NOCH ₃)	H	i-Pr	H	6-Me-2-i-C ₃ F ₇	
Q27	27-210	3,4-Cl ₂	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	
Q27	27-211	3,6-Cl ₂	H	i-Pr	H	4-Me-2-n-C ₃ F ₇	
Q27	27-212	3,5-Cl ₂	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	
Q27	27-213	3,5-Cl ₂	H	i-Pr	H	6-Me-2-CF ₂ CF ₃	
Q27	27-214	4,5-Cl ₂	H	i-Pr	H	4-Me-2-n-C ₃ F ₇	
Q27	27-215	4,5-Cl ₂	H	i-Pr	H	6-Me-2-i-C ₃ F ₇	
Q27	27-216	3-I-4-Cl	H	i-Pr	H	4-Me-2-CF ₂ CF ₃	
Q27	27-217	3-I-4-F	H	i-Pr	H	4-Me-2-n-C ₃ F ₇	
Q27	27-218	3-I-4CF ₃	H	i-Pr	H	4-Me-2-i-C ₃ F ₇	
Q27	27-219	3-I-4-OCH ₃	H	i-Pr	H	4-Me-2-CF ₂ CF ₃	
Q27	27-220	3-CF ₃ -4-Cl	H	i-Pr	H	4-Me-2-n-C ₃ F ₇	
Q27	27-221	3-CF ₃ -4-OCH ₃	H	i-Pr	H	6-Me-2-i-C ₃ F ₇	
Q27	27-222	3-OCH ₂ O-4	H	i-Pr	H	6-Me-2-i-C ₃ F ₇	
Q27	27-223	3-OCF ₃ O-4	H	i-Pr	H	6-Me-2-CF ₂ CF ₃	
Q27	27-224	3-OCH ₂ CH ₂ O-4	H	i-Pr	H	6-Me-2-n-C ₃ F ₇	
Q27	27-225	3-OCF ₃ CF ₂ O-4	H	i-Pr	H	6-Me-2-i-C ₃ F ₇	
Q27	27-226	3-CH=CH-CH=CH-4	H	i-Pr	H	6-Me-2-i-C ₃ F ₇	

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-227	3-I	H		i-Pr H	4-Me-3-CF ₂ CF ₃	
Q27	27-228	3-I	H		i-Pr H	4-Me-3-i-C ₃ F ₇	
Q27	27-229	3-I	H		i-Pr H	4-Me-3-n-C ₃ F ₇	
Q27	27-230	3-I	H		i-Pr H	6-Cl-2-i-C ₃ F ₇	188
Q27	27-231	3-I	Et		Et H	6-Cl-2-i-C ₃ F ₇	164
Q27	27-232	3-I	H	CH(Me)CH ₂ SMe	H	6-Cl-2-i-C ₃ F ₇	177
Q27	27-233	3-I	H	C(Me) ₂ CH ₂ SMe	H	2-i-C ₃ F ₇	229
Q27	27-234	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Cl-2-i-C ₃ F ₇	175
Q27	27-235	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Cl-2-i-C ₃ F ₇	Paste
Q27	27-236	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Cl-2-i-C ₃ F ₇	Amorphous
Q27	27-237	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-i-C ₃ F ₇	183
Q27	27-238	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-i-C ₃ F ₇	Amorphous
Q27	27-239	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-i-C ₃ F ₇	Amorphous
Q27	27-240	3-I	H	C(Me) ₂ CH ₂ SMe	H	4,6-Cl ₂ -2-i-C ₃ F ₇	120
Q27	27-241	3-I	H	CH(Me)CH ₂ SMe	H	6-MeO-2-i-C ₃ F ₇	134
Q27	27-242	3-I	H		i-Pr H	6-MeO-2-i-C ₃ F ₇	158
Q27	27-243	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-MeO-2-i-C ₃ F ₇	134
Q27	27-244	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-MeO-2-i-C ₃ F ₇	Amorphous
Q27	27-245	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-MeS-2-i-C ₃ F ₇	179
Q27	27-246	3-I	H		i-Pr H	6-MeS-2-i-C ₃ F ₇	219
Q27	27-247	3-I	H		i-Pr H	6-MeSO-2-i-C ₃ F ₇	Amorphous
Q27	27-248	3-I	H	C(Me) ₂ CH ₂ SMe	H	2-OCHF ₂	198
Q27	27-249	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	2-OCHF ₂	207

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-250	3-I	H		i-Pr H	2-OCHF ₂	205
Q27	27-251	3-I	H	C(Me) ₂ CH ₂ SMe	H	2-SCHF ₂	174
Q27	27-252	3-I	H		i-Pr H	2-SCHF ₂	226
Q27	27-253	3-I	H		i-Pr H	2-SO ₂ CHF ₂	230
Q27	27-254	3-I	H		i-Pr H	6-Me-2-OCHF ₂	252
Q27	27-255	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCHF ₂	124
Q27	27-256	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCHF ₂	185
Q27	27-257	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCHF ₂	102
Q27	27-258	3-I	H		i-Pr H	6-Me-2-SCHF ₂	226
Q27	27-259	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-SCHF ₂	198
Q27	27-260	3-I	H		i-Pr H	6-Me-2-OCH(CF ₃) ₂	266
Q27	27-261	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	223
Q27	27-262	3-I	H		i-Pr H	6-Cl-2-OCH(CF ₃) ₂	216
Q27	27-263	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Cl-2-OCH(CF ₃) ₂	100
Q27	27-264	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	168
Q27	27-265	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	134
Q27	27-266	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Cl-2-OCH(CF ₃) ₂	
Q27	27-267	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Cl-2-OCH(CF ₃) ₂	121
Q27	27-268	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-OMe-2-OCH(CF ₃) ₂	159
Q27	27-269	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-F-2-OCH(CF ₃) ₂	
Q27	27-270	3-I	H		i-Pr H	OCH(CF ₃) ₂	240
Q27	27-271	3-I	H		t-Bu H	OCH(CF ₃) ₂	
Q27	27-272	3-I	H	CH(Me)CH ₂ SMe	H	OCH(CF ₃) ₂	

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-273	3-I	H	C(Me) ₂ CH ₂ SMe	H	OCH(CF ₃) ₂	237
Q27	27-274	3-I	H		i-Pr	H 2-Me-6-OCH(CF ₃) ₂	232
Q27	27-275	3-I	H	C(Me) ₂ CH ₂ SMe	H	2-Me-6-OCH(CF ₃) ₂	171
Q27	27-276	3-Cl	H		i-Pr	H 4-Me-2-OCH(CF ₃) ₂	226
Q27	27-277	3-I	H		i-Pr	H 4-Me-2-OCH(CF ₃) ₂	248
Q27	27-278	3-I	H	C(Me) ₂ CH ₂ SMe	H	4-Me-2-OCH(CF ₃) ₂	200
Q27	27-279	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	4-Me-2-OCH(CF ₃) ₂	118
Q27	27-280	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	4-Me-2-OCH(CF ₃) ₂	112
Q27	27-281	3-I	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-282	3-I	H	CH(Me)CH ₂ SET	H	6-Me-2-OCH(CF ₃) ₂	256
Q27	27-283	H	H		i-Pr	H 6-Me-2-OCH(CF ₃) ₂	235
Q27	27-284	H	H		t-Bu	H 6-Me-2-OCH(CF ₃) ₂	255
Q27	27-285	H	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-286	H	H	CH(Me)CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-287	H	H	CH(Me)CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-288	H	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-289	H	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	108
Q27	27-290	H	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-291	3-F	H		i-Pr	H 6-Me-2-OCH(CF ₃) ₂	
Q27	27-292	3-F	H		t-Bu	H 6-Me-2-OCH(CF ₃) ₂	
Q27	27-293	3-F	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-294	3-F	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-295	3-F	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-296	3-F	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-297	3-Cl	H		i-Pr	H	6-Me-2-OCH(CF ₃) ₂
Q27	27-298	3-Cl	H		t-Bu	H	6-Me-2-OCH(CF ₃) ₂
Q27	27-299	3-Cl	Et		Et	H	6-Me-2-OCH(CF ₃) ₂
Q27	27-300	3-Cl	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-301	3-Cl	H	CH(Me)CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-302	3-Cl	H	CH(Me)CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-303	3-Cl	H	CH(Me)CH ₂ SET	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-304	3-Cl	H	CH(Me)CH ₂ SO ₂ Et	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-305	3-Cl	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	236
Q27	27-306	3-Cl	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	115
Q27	27-307	3-Cl	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	221
Q27	27-308	3-Br	H		i-Pr	H	6-Me-2-OCH(CF ₃) ₂
Q27	27-309	3-Br	H		t-Bu	H	6-Me-2-OCH(CF ₃) ₂
Q27	27-310	3-Br	Et		Et	H	6-Me-2-OCH(CF ₃) ₂
Q27	27-311	3-Br	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-312	3-Br	H	CH(Me)CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-313	3-Br	H	CH(Me)CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-314	3-Br	H	CH(Me)CH ₂ SET	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-315	3-Br	H	CH(Me)CH ₂ SO ₂ Et	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-316	3-Br	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	228
Q27	27-317	3-Br	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	115
Q27	27-318	3-Br	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	225

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-319	3-I	H		Me H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-320	3-I	H		Et H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-321	3-I	H		n-Pr H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-322	3-I	H		c-C ₆ H ₅ H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-323	3-I	H		n-Bu H	6-Me-2-OCH(CF ₃) ₂	261
Q27	27-324	3-I	H		s-Bu H	6-Me-2-OCH(CF ₃) ₂	274
Q27	27-325	3-I	H		t-Bu H	6-Me-2-OCH(CF ₃) ₂	241
Q27	27-326	3-I	H		i-Bu H	6-Me-2-OCH(CF ₃) ₂	264
Q27	27-327	3-I	Et		Et H	6-Me-2-OCH(CF ₃) ₂	165
Q27	27-328	3-I	Me		i-Pr H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-329	3-Cl-4-F	H		i-Pr H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-330	3-Cl-4-F	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-331	3-Cl-4-F	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-332	3,4-Cl ₂	H		i-Pr H	6-Me-2-OCH(CF ₃) ₂	267
Q27	27-333	3,4-Cl ₂	H		t-Bu H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-334	3,4-Cl ₂	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	210
Q27	27-335	3,4-Cl ₂	H	CH(Me)CH ₂ SCOMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-336	3,4-Cl ₂	H	CH(Me)CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	126
Q27	27-337	3,4-Cl ₂	H	CH(Me)CH ₂ SEt	H	6-Me-2-OCH(CF ₃) ₂	205
Q27	27-338	3,4-Cl ₂	H	CH(Me)CH ₂ SOEt	H	6-Me-2-OCH(CF ₃) ₂	119
Q27	27-339	3,4-Cl ₂	H	CH(Me)CH ₂ SO ₂ Et	H	6-Me-2-OCH(CF ₃) ₂	111
Q27	27-340	3,4-Cl ₂	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-341	3-Br-4-Cl	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-342	3,4-Br ₂	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-343	3-I-4-F	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-344	3-I-4-Cl	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-345	3-I-4-Br	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-346	3,4-I ₂	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-347	3-NO ₂	H		i-Pr	H	6-Me-2-OCH(CF ₃) ₂ 207
Q27	27-348	3-NO ₂	H		t-Bu	H	6-Me-2-OCH(CF ₃) ₂
Q27	27-349	3-NO ₂	Et		Et	H	6-Me-2-OCH(CF ₃) ₂
Q27	27-350	3-NO ₂	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-351	3-NO ₂	H	CH(Me)CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-352	3-NO ₂	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	244
Q27	27-353	3-NO ₂	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	230
Q27	27-354	3-CF ₃	H		i-Pr	H	6-Me-2-OCH(CF ₃) ₂ 211
Q27	27-355	3-CF ₃	H		t-Bu	H	6-Me-2-OCH(CF ₃) ₂ 246
Q27	27-356	3-CF ₃	Et		Et	H	6-Me-2-OCH(CF ₃) ₂
Q27	27-357	3-CF ₃	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-358	3-CF ₃	H	CH(Me)CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-359	3-CF ₃	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	226
Q27	27-360	3-CF ₃	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	112
Q27	27-361	3-CF ₃	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-362	3-OCF ₃	H		i-Pr	H	6-Me-2-OCH(CF ₃) ₂
Q27	27-363	3-OCF ₃	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-364	3-OCF ₃	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-365	3-S <i>C</i> F ₃	H		i-Pr H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-366	3-S <i>C</i> F ₃	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-367	3-S <i>C</i> F ₃	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-368	3-SOCF ₃	H		i-Pr H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-369	3-SO ₂ CF ₃	H		i-Pr H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-370	3-Me	H		i-Pr H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-371	3-Et	H		i-Pr H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-372	5-t-Bu	H		i-Pr H	6-Me-2-OCH(CF ₃) ₂	280
Q27	27-373	3-C≡CH	H		i-Pr H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-374	3-C≡CCF ₃	H		i-Pr H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-375	3-C≡C-t-Bu	H		i-Pr H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-376	3-C≡C-SiMe ₃	H		i-Pr H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-377	3-C≡C-Ph	H		i-Pr H	6-Me-2-OCH(CF ₃) ₂	
Q27	27-378	3-I	H		i-Pr H	6-Me-2-OCF ₂ CHF ₂	217
Q27	27-379	3-I	H		t-Bu H	6-Me-2-OCF ₂ CHF ₂	
Q27	27-380	3-I	Et		Et H	6-Me-2-OCF ₂ CHF ₂	
Q27	27-381	3-I	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCF ₂ CHF ₂	
Q27	27-382	3-I	H	CH(Me)CH ₂ SO ₂ Me	H	6-Me-2-OCF ₂ CHF ₂	
Q27	27-383	3-I	H	CH(Me)CH ₂ SO ₂ Me	H	6-Me-2-OCF ₂ CHF ₂	
Q27	27-384	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCF ₂ CHF ₂	99
Q27	27-385	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCF ₂ CHF ₂	
Q27	27-386	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCF ₂ CHF ₂	
Q27	27-387	3-I	H		i-Pr H	6-Cl-2-OCF ₂ CHF ₂	200

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Yn	mp (°C)
Q27	27-388	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Cl-2-OCF ₂ CHF ₂	142
Q27	27-389	3-I	H	C(Me) ₂ CH ₂ SOMe	H	6-Cl-2-OCF ₂ CHF ₂	
Q27	27-390	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Cl-2-OCF ₂ CHF ₂	
Q27	27-391	3-I	H		i-Pr	H 6-Me-2-OCF ₂ CHFCF ₃	205
Q27	27-392	3-I	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCF ₂ CHFCF ₃	
Q27	27-393	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCF ₂ CHFCF ₃	158
Q27	27-394	3-I	H		i-Pr	H 6-Me-2-OCF ₂ CHFCF ₃	
Q27	27-395	3-I	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCF ₂ CHFCF ₃	
Q27	27-396	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCF ₂ CHFCF ₃	126
Q27	27-397	3-I	H		i-Pr	H 6-Me-2-OCF ₂ CHFOC ₃ F _{7-n}	194
Q27	27-398	3-I	H		t-Bu	H 6-Me-2-OCF ₂ CHFOC ₃ F _{7-n}	
Q27	27-399	3-I	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCF ₂ CHFOC ₃ F _{7-n}	
Q27	27-400	3-I	H	CH(Me)CH ₂ SOMe	H	6-Me-2-OCF ₂ CHFOC ₃ F _{7-n}	
Q27	27-401	3-I	H	CH(Me)CH ₂ SO ₂ Me	H	6-Me-2-OCF ₂ CHFOC ₃ F _{7-n}	
Q27	27-402	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCF ₂ CHFOC ₃ F _{7-n}	91
Q27	27-403	3-I	H	C(Me) ₂ CH ₂ SOMe	H	6-Me-2-OCF ₂ CHFOC ₃ F _{7-n}	81
Q27	27-404	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-OCF ₂ CHFOC ₃ F _{7-n}	157
Q27	27-405	3-I	H		i-Pr	H 6-Cl-2-OCF ₂ CHFOC ₃ F _{7-n}	205
Q27	27-406	3-I	H		t-Bu	H 6-Cl-2-OCF ₂ CHFOC ₃ F _{7-n}	
Q27	27-407	3-I	H	CH(Me)CH ₂ SMe	H	6-Cl-2-OCF ₂ CHFOC ₃ F _{7-n}	106
Q27	27-408	3-I	H	CH(Me)CH ₂ SOMe	H	6-Cl-2-OCF ₂ CHFOC ₃ F _{7-n}	
Q27	27-409	3-I	H	CH(Me)CH ₂ SO ₂ Me	H	6-Cl-2-OCF ₂ CHFOC ₃ F _{7-n}	
Q27	27-410	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Cl-2-OCF ₂ CHFOC ₃ F _{7-n}	

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-411	3-I	H	C(Me) ₂ CH ₂ SOMe	H	6-Cl-2-OCF ₂ CHFOC ₂ F ₇ -n	
Q27	27-412	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Cl-2-OCF ₂ CHFOC ₂ F ₇ -n	
Q27	27-413	3-I	H		i-Pr	H 6-Me-2-OCH ₂ C ₂ F ₅	259
Q27	27-414	3-I	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCH ₂ C ₂ F ₅	208
Q27	27-415	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH ₂ C ₂ F ₅	
Q27	27-416	3-I	H		i-Pr	H 6-Me-2-OCH ₂ -n-C ₃ F ₇	
Q27	27-417	3-I	H	CH(Me)CH ₂ SMe	H	6-Me-2-OCH ₂ -n-C ₃ F ₇	
Q27	27-418	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCH ₂ -n-C ₃ F ₇	
Q27	27-419	3-I	H		i-Pr	H 6-Me-2-O-(2,4-Cl ₂ -Ph)	
Q27	27-420	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-O-(2,4-Cl ₂ -Ph)	
Q27	27-421	3-I	H		i-Pr	H 6-Me-2-O-(2-Cl-4-CF ₃ -Ph)	
Q27	27-422	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-O-(2-Cl-4-CF ₃ -Ph)	
Q27	27-423	3-I	H		i-Pr	H 6-Me-2-SCF ₃	
Q27	27-424	3-I	H	CH(Me)CH ₂ SMe	H	6-Me-2-SCF ₃	
Q27	27-425	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-SCF ₃	
Q27	27-426	3-I	H	C(Me) ₂ CH ₂ SOMe	H	6-Me-2-SCF ₃	
Q27	27-427	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-SCF ₃	
Q27	27-428	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-SOCF ₃	
Q27	27-429	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-SO ₂ CF ₃	
Q27	27-430	3-I	H		i-Pr	H 6-Me-2-SC ₂ F ₅	
Q27	27-431	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-SC ₂ F ₅	
Q27	27-432	3-I	H		i-Pr	H 6-Me-2-S-n-C ₃ F ₇	
Q27	27-433	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-S-n-C ₃ F ₇	
Q27	27-436	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-S-CH(CF ₃) ₂	

Table 7 (Continued)

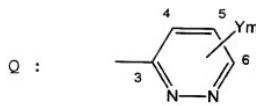
Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q27	27-434	3-I	H		i-Pr H	6-Me-2-SCF ₂ CHF ₂	
Q27	27-435	3-I	H	CH(Me)CH ₂ SMe	H	6-Me-2-SCF ₂ CHFC ₃	
Q27	27-437	3-I	H		i-Pr H	6-Me-2-NHCOCF ₃	
Q27	27-438	3-I	H		i-Pr H	6-Me-2-NHCOC ₂ F ₅	192
Q27	27-439	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-NHCOC ₂ F ₅	205
Q27	27-440	3-I	H		i-Pr H	6-Me-2-NHCOC ₂ F ₇ -n	
Q27	27-441	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-NHCOC ₃ F ₇ -n	
Q27	27-442	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-NHCO-(2,4-Cl ₂ -Ph)	
Q27	27-443	3-I	H		i-Pr H	6-Me-2-NHCO-(4-CF ₃ -Ph)	
Q27	27-444	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-N(COC ₂ F ₅) ₂	
Q27	27-445	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-NHCH ₂ CF ₃	
Q27	27-446	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-NHCH ₂ CF ₃	
Q27	27-447	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-NHCH ₂ C ₂ F ₅	
Q27	27-448	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-Cl	173
Q27	27-449	3-CF ₃	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-i-C ₃ F ₇	214
Q27	27-450	H	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-i-C ₃ F ₇	155
Q27	27-451	3-F	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-i-C ₃ F ₇	202
Q27	27-452	3-F	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-i-C ₃ F ₇	197
Q27	27-453	3-Br	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-i-C ₃ F ₇	206
Q27	27-454	3-Br	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-i-C ₃ F ₇	225
Q27	27-455	3,4-Cl ₂	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-i-C ₃ F ₇	259
Q27	27-456	3-CF ₃	H		i-Pr H	6-Me-2-i-C ₃ F ₇	221

Table 7 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Yn	mp (°C)	
Q27	27-457	H	H	i-Pr	H	6-Cl-2-i-C ₃ F,	200	
Q27	27-458	H	H	C(Me) ₂ CH ₂ SMe	H	6-Cl-2-i-C ₃ F,	110	
Q27	27-459	3-Cl	H		i-Pr	H	6-Cl-2-i-C ₃ F,	
Q27	27-460	3-I	H		t-Bu	H	6-Cl-2-i-C ₃ F,	
Q27	27-461	3-F	H	C(Me) ₂ CH ₂ SMe	H	6-Cl-2-i-C ₃ F,	182	
Q27	27-462	3-Cl	H	C(Me) ₂ CH ₂ SMe	H	6-Cl-2-i-C ₃ F,	161	
Q27	27-463	3,4-Cl ₂	H	C(Me) ₂ CH ₂ SMe	H	6-Cl-2-i-C ₃ F,	153	
Q27	27-464	3-CF ₃	H	C(Me) ₂ CH ₂ SMe	H	6-Cl-2-i-C ₃ F,	165	
Q27	27-465	3-NO ₂	H	C(Me) ₂ CH ₂ SMe	H	6-Cl-2-i-C ₃ F,	235	
Q27	27-466	3-I	H		i-Pr	H	6-Me-2-O(4-CF ₃ -Ph)	238
Q27	27-467	3-I	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-O(4-CF ₃ -Ph)	111	
Q27	27-468	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-O(4-CF ₃ -Ph)	106	
Q27	27-469	3-I	H	C(Me) ₂ CH ₂ SO ₂ Me	H	6-Me-2-O(4-CF ₃ -Ph)	97	
Q27	27-470	3-CF ₃	H	C(Me) ₂ CH ₂ SMe	H	6-Me-2-OCF ₂ CHFOCF ₃		
							Amorphous	
Q27	27-471	3-I	H		i-Pr	H	6-Me-2-OCF=CFCF ₃	165
Q27	27-472	3-I	H		i-Pr	H	6-Me-2-OCF ₂ CHFOCF ₃	185

In Table 7, some compounds are amorphous or pasty. $^1\text{H-NMR}$ data of such compounds are shown below.

No	$^1\text{H-NMR}$ [δ (ppm/ CDCl_3)]
27-153	1.59(s. 3H), 1.64(s. 3H), 2.26(s. 3H), 2.62(s. 3H), 2.88(d. 1H), 3.02(d. 1H), 6.83(br. 1H), 7.23(t. 1H), 7.58(dd. 1H), 7.78(d. 1H), 8.00(dd. 1H), 8.58(br. 1H), 8.81(d. 1H).
27-235	1.64(s. 3H), 1.66(s. 3H), 2.40(s. 3H), 2.88(d. 1H), 3.24(d. 1H), 6.72(br. 1H), 7.24(t. 1H), 7.70(dd. 1H), 7.74(d. 1H), 8.03(dd. 1H), 8.85(br. 1H), 9.12(d. 1H).
27-236	1.71(s. 6H), 2.71(s. 3H), 3.63(s. 2H), 6.25(br. 1H), 7.25(t. 1H), 7.70(dd. 1H), 7.75(dd. 1H), 8.05(dd. 1H), 8.81(br. 1H), 9.11(d. 1H).
27-238	1.68(s. 3H), 1.72(s. 3H), 2.49(s. 3H), 2.99(d. 1H), 3.21(d. 1H), 6.76(br. 1H), 7.21(t. 1H), 7.50(dd. 1H), 7.66(dd. 1H), 7.84(dd. 1H), 8.37(dd. 1H), 8.68(d. 1H), 9.75(br. 1H).
27-239	1.80(s. 6H), 2.87(s. 3H), 3.73(s. 2H), 6.23(br. 1H), 7.23(t. 1H), 7.43(dd. 1H), 7.65(dd. 1H), 7.82(dd. 1H), 8.35(dd. 1H), 8.64(d. 1H), 9.88(br. 1H).
27-244	1.60(s. 3H), 1.63(s. 3H), 2.41(s. 3H), 2.84(d. 1H), 3.31(d. 1H), 4.02(s. 1H), 6.59(br. 1H), 7.21(t. 1H), 7.34(dd. 1H), 7.69(dd. 1H), 7.99(dd. 1H), 8.65(br. 1H), 8.88(d. 1H).
27-247	1.31(dd. 6H), 3.50(s. 3H), 4.33(m. 1H), 5.60(d. 1H), 7.19(t. 1H), 7.68(d. 1H), 7.74(dd. 1H), 8.00(d. 1H), 9.26(d. 1H), 11.8(br. 1H).
27-470	1.42(s. 6H), 1.96(s. 3H), 2.53(s. 3H), 2.81(s. 2H), 6.17(s. 1H), 6.62(dt. 1H), 6.90(d. 1H), 7.66(t. 1H), 7.85(d. 1H), 8.03(d. 1H), 8.63(d. 1H), 8.71(s. 1H).



Q29

Table 8 ($Z^1 = Z^2 = O$)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q29	29- 1	3-Cl	H	i-Pr	H	H	
Q29	29- 2	3-Cl	H	i-Pr	H	4-Me-6-C ₂ F ₅	
Q29	29- 3	3-Br	H	i-Pr	H	4-Me-6-n-C ₃ F ₇	
Q29	29- 4	3-NO ₂	H	i-Pr	H	4-Me-6-i-C ₃ F ₇	
Q29	29- 5	3-I	H	i-Pr	H	H	
Q29	29- 6	3-I	H	i-Pr	H	6-Cl	136
Q29	29- 7	3-I	H	i-Pr	H	6-C ₂ F ₅	
Q29	29- 8	3-I	H	i-Pr	H	6-n-C ₃ F ₇	
Q29	29- 9	3-I	H	i-Pr	H	6-i-C ₃ F ₇	
Q29	29-10	3-I	H	i-Pr	H	4-Me-6-C ₂ F ₅	
Q29	29-11	3-I	H	i-Pr	H	4-Me-6-n-C ₃ F ₇	
Q29	29-12	3-I	H	i-Pr	H	4-Me-6-i-C ₃ F ₇	
Q29	29-13	3-I	H	i-Pr	H	4-Me-5-C ₂ F ₅	
Q29	29-14	3-I	H	i-Pr	H	4-Me-5-n-C ₃ F ₇	
Q29	29-15	3-I	H	i-Pr	H	4-Me-5-i-C ₃ F ₇	

Table 8 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q29	29-16	3-I	H	t-Bu		H 6-i-C ₃ F ₇	
Q29	29-17	3-I	H	t-Bu		H 6-C ₂ F ₅	
Q29	29-18	3-I	H	t-Bu		H 6-n-C ₃ F ₇	
Q29	29-19	3-I	H	t-Bu		H 4-Me-6-i-C ₃ F ₇	
Q29	29-20	3-I	H	CH(CH ₃)CH ₂ SCH ₃		H 4-Me-6-i-C ₃ F ₇	
Q29	29-21	3-I	H	CH(CH ₃)CH ₂ SOCH ₃		H 4-Me-6-i-C ₃ F ₇	
Q29	29-22	3-I	H	CH(CH ₃)CH ₂ SO ₂ CH ₃		H 4-Me-6-i-C ₃ F ₇	
Q29	29-23	3-I	H	C(CH ₃) ₂ CH ₂ SCH ₃		H 4-Me-6-i-C ₃ F ₇	
Q29	29-24	3-I	H	C(CH ₃) ₂ CH ₂ SOCH ₃		H 4-Me-6-i-C ₃ F ₇	
Q29	29-25	3-I	H	C(CH ₃) ₂ CH ₂ SO ₂ CH ₃		H 4-Me-6-i-C ₃ F ₇	
Q29	29-26	3-I	H	CH(CH ₃)CH ₂ NHAc		H 4-Me-6-i-C ₃ F ₇	
Q29	29-27	3-I	H	C(CH ₃) ₂ CH ₂ NHAc		H 4-Me-6-i-C ₃ F ₇	
Q29	29-28	3-I	H	CH(CH ₃)CH ₂ CH ₂ OCH ₃		H 4-Me-6-i-C ₃ F ₇	
Q29	29-29	3-I	H	C(CH ₃) ₂ CH ₂ CH ₂ OCH ₃		H 4-Me-6-i-C ₃ F ₇	
Q29	29-30	3-I	Et	Et		H H	
Q29	29-31	3-I	Et	Et		H 4-Me-6-C ₂ F ₅	
Q29	29-32	3-I	Et	Et		H 4-Me-6-n-C ₃ F ₇	
Q29	29-33	3-I	Et	Et		H 4-Me-6-i-C ₃ F ₇	
Q29	29-34	3-I	Et	Et		H 6-Cl	
Q29	29-35	3-I	Et	Et		H 6-Br	
Q29	29-36	3-I	Et	Et		H 6-n-C ₃ F ₇	
Q29	29-37	3-CF ₃	H	i-Pr		H 4-Me-6-C ₂ F ₅	
Q29	29-38	3-Ph	H	i-Pr		H 4-Me-6-n-C ₃ F ₇	

Table 8 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q29	29-39	3-SO ₂ CF ₃	H	i-Pr	H	4-Me-6-i-C ₃ F ₇	
Q29	29-40	3-C ₂ F ₅	H	i-Pr	H	4-Me-6-C ₂ F ₅	
Q29	29-41	3-I-4-Cl	H	i-Pr	H	4-Me-6-n-C ₃ F ₇	
Q29	29-42	3-I-4-CF ₃	H	i-Pr	H	4-Me-6-i-C ₃ F ₇	
Q29	29-43	3-CF ₃ -4-Cl	H	i-Pr	H	4-Me-6-C ₂ F ₅	
Q29	29-44	3-OCH ₂ O-4	H	i-Pr	H	4-Me-6-n-C ₃ F ₇	
Q29	29-45	3-OCH ₂ CF ₃ O-4	H	i-Pr	H	4-Me-6-i-C ₃ F ₇	

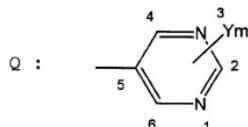


Table 9 ($Z^1 = Z^2 = O$)

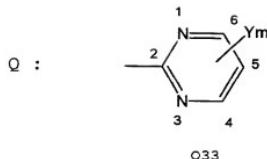
Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q32	32- 1	3-Cl	H i-Pr		H H		
Q32	32- 2	3-Cl	H i-Pr		H 4-Me-2-C ₂ F ₅		
Q32	32- 3	3-Br	H i-Pr		H 4-Me-2-n-C ₃ F ₇		
Q32	32- 4	3-NO ₂	H i-Pr		H 4-Me-2-i-C ₃ F ₇		
Q32	32- 5	3-I	H i-Pr		H 2-C ₂ F ₅		
Q32	32- 6	3-I	H i-Pr		H 2-n-C ₃ F ₇		
Q32	32- 7	3-I	H i-Pr		H 2-i-C ₃ F ₇		
Q32	32- 8	3-I	H i-Pr		H 4-Me-2-C ₂ F ₅		
Q32	32- 9	3-I	H i-Pr		H 4-Me-2-n-C ₃ F ₇		
Q32	32-10	3-I	H i-Pr		H 4-Me-2-i-C ₃ F ₇		
Q32	32-11	3-I	H i-Pr		H 4,6-Cl ₂	257	
Q32	32-12	3-I	H t-Bu		H 2-i-C ₃ F ₇		
Q32	32-13	3-I	H t-Bu		H 2-C ₂ F ₅		
Q32	32-14	3-I	H t-Bu		H 2-n-C ₃ F ₇		
Q32	32-15	3-I	H t-Bu		H 4-Me-2-i-C ₃ F ₇		
Q32	32-16	3-I	H CH(CH ₃)CH ₂ SCH ₃		H 4-Me-2-i-C ₃ F ₇		
Q32	32-17	3-I	H CH(CH ₃)CH ₂ SOCH ₃		H 4-Me-2-i-C ₃ F ₇		
Q32	32-18	3-I	H CH(CH ₃)CH ₂ SO ₂ CH ₃		H 4-Me-2-i-C ₃ F ₇		
Q32	32-19	3-I	H C(CH ₃) ₂ CH ₂ SCH ₃		H 4-Me-2-i-C ₃ F ₇	202	
Q32	32-20	3-I	H C(CH ₃) ₂ CH ₂ SOCH ₃		H 4-Me-2-i-C ₃ F ₇		
Q32	32-21	3-I	H C(CH ₃) ₂ CH ₂ SO ₂ CH ₃		H 4-Me-2-i-C ₃ F ₇		
Q32	32-22	3-I	H CH(CH ₃)CH ₂ SET		H 4-Me-2-i-C ₃ F ₇		
Q32	32-23	3-I	H C(CH ₃) ₂ CH ₂ SET		H 4-Me-2-i-C ₃ F ₇		

Table 9 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q32	32-24	3-I	H	CH(CH ₃)CH ₂ CH ₂ SCH ₃	H	4-Me-2-i-C ₃ F ₇	
Q32	32-25	3-I	H	C(CH ₃) ₂ CH ₂ CH ₂ SCH ₃	H	4-Me-2-i-C ₃ F ₇	
Q32	32-26	3-I	Et	Et		4-Me-2-C ₂ F ₅	
Q32	32-27	3-I	Et	Et		4-Me-2-n-C ₃ F ₇	
Q32	32-28	3-I	Et	Et		4-Me-2-i-C ₃ F ₇	
Q32	32-29	3-I	Et	Et		2-Cl	
Q32	32-30	3-I	Et	Et		2-Br	
Q32	32-31	3-I	Et	Et		2-n-C ₃ F ₇	
Q32	32-32	3-CF ₃	H	i-Pr		4-Me-2-C ₂ F ₅	
Q32	32-33	3-Ph	H	i-Pr		4-Me-2-n-C ₃ F ₇	
Q32	32-34	3-SOCF ₃	H	i-Pr		4-Me-2-i-C ₃ F ₇	
Q32	32-35	3-C ₂ F ₅	H	i-Pr		4-Me-2-C ₂ F ₅	
Q32	32-36	3-I-4-Cl	H	i-Pr		4-Me-2-n-C ₃ F ₇	
Q32	32-37	3-I-4-CF ₃	H	i-Pr		4-Me-2-i-C ₃ F ₇	
Q32	32-38	3-CF ₃ -4-Cl	H	i-Pr		4-Me-2-C ₂ F ₅	
Q32	32-39	3-OCF ₂ O-4	H	i-Pr		4-Me-2-n-C ₃ F ₇	
Q32	32-40	3-OCF ₂ CF ₂ O-4	H	i-Pr		4-Me-2-i-C ₃ F ₇	
Q32	32-41	3-I	H	CH(Me)CH ₂ SM ₂	H	4-Me-2-Cl	210
Q32	32-42	3-I	Et	Et		4, 6-(OCH ₂ CF ₃) ₂	
						Amorphous	

In Table 9, ¹H-NMR data of the compound being amorphous is shown below.

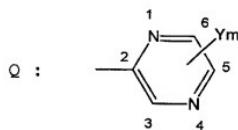
No	¹ H-NMR [δ (ppm/CDCl ₃)]
32-42	1.04(s. 3H), 1.31(t. 3H), 3.10(m. 3H), 3.42(m. 1H), 3.80(m. 1H), 4.96-4.74(m. 4H), 7.22(t. 1H), 7.87(d. 1H), 8.04(dd. 1H), 8.39(s. 1H).

Table 10 ($Z^1 = Z^2 = O$)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C), nD (°C)
Q33	33- 1	H	H i-Pr		H 4,6-(OMe) ₂		61
Q33	33- 2	3-Cl	H i-Pr		H H		
Q33	33- 3	3-Cl	H i-Pr		H 5-C ₂ F ₅		
Q33	33- 4	3-Br	H i-Pr		H 5-n-C ₃ F ₇		
Q33	33- 5	3-NO ₂	H i-Pr		H 5-i-C ₃ F ₇		
Q33	33- 6	3-I	H i-Pr		H 5-C ₂ F ₅		
Q33	33- 7	3-I	H i-Pr		H 5-n-C ₃ F ₇		
Q33	33- 8	3-I	H i-Pr		H 5-i-C ₃ F ₇		
Q33	33- 9	3-I	H i-Pr		H 4,6-OMe ₂		
						nD 1.5672(20.9)	
Q33	33-10	3-I	H i-Pr		H 4,6-OMe ₂ -5-i-C ₃ F ₇		
						nD 1.5045(21.9)	
Q33	33-11	3-I	H t-Bu		H 5-i-C ₃ F ₇		
Q33	33-12	3-I	H t-Bu		H 5-C ₂ F ₅		
Q33	33-13	3-I	H t-Bu		H 5-n-C ₃ F ₇		
Q33	33-14	3-I	H CH(CH ₃)CH ₂ SCH ₃		H 5-i-C ₃ F ₇		
Q33	33-15	3-I	H CH(CH ₃)CH ₂ SOCH ₃		H 5-i-C ₃ F ₇		

Table 10 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C), nD (°C)
Q33	33-16	3-I	H	CH(CH ₃)CH ₂ SO ₂ CH ₃	H	5-i-C ₃ F ₇	
Q33	33-17	3-I	H	C(CH ₃) ₂ CH ₂ SCH ₃	H	5-i-C ₃ F ₇	
Q33	33-18	3-I	H	C(CH ₃) ₂ CH ₂ SOCH ₃	H	5-i-C ₃ F ₇	
Q33	33-19	3-I	H	C(CH ₃) ₂ CH ₂ SO ₂ CH ₃	H	5-i-C ₃ F ₇	
Q33	33-20	3-I	H	CH(CH ₃)CH ₂ SET	H	5-i-C ₃ F ₇	
Q33	33-21	3-I	H	C(CH ₃) ₂ CH ₂ SET	H	5-i-C ₃ F ₇	
Q33	33-22	3-I	H	CH(CH ₃)CH ₂ CH ₂ SCH ₃	H	5-i-C ₃ F ₇	
Q33	33-23	3-I	H	C(CH ₃) ₂ CH ₂ CH ₂ SCH ₃	H	5-i-C ₃ F ₇	
Q33	33-24	3-I	Et	Et	H	5-C ₂ F ₅	
Q33	33-25	3-I	Et	Et	H	5-n-C ₃ F ₇	
Q33	33-26	3-I	Et	Et	H	5-i-C ₃ F ₇	
Q33	33-27	3-I	Et	Et	H	5-Cl	
Q33	33-28	3-I	Et	Et	H	5-Br	
Q33	33-29	3-I	Et	Et	H	5-n-C ₃ F ₇	



Q34

Table 11 ($Z^1 = Z^2 = O$)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q34	34- 1	3-Cl	H i-Pr		H H		
Q34	34- 2	3-Cl	H i-Pr		H 3-Me-5-C ₂ F ₅		
Q34	34- 3	3-Br	H i-Pr		H 3-Me-5-n-C ₃ F ₇		
Q34	34- 4	3-NO ₂	H i-Pr		H 3-Me-5-i-C ₃ F ₇		
Q34	34- 5	3-I	H i-Pr		H H		185
Q34	34- 6	3-I	H i-Pr		H 5-I		198
Q34	34- 7	3-I	H i-Pr		H 5-C ₂ F ₅		
Q34	34- 8	3-I	H i-Pr		H 5-n-C ₃ F ₇		
Q34	34- 9	3-I	H i-Pr		H 5-i-C ₃ F ₇		
Q34	34-10	3-I	H i-Pr		H 3-Me-5-C ₂ F ₅		
Q34	34-11	3-I	H i-Pr		H 3-Me-5-n-C ₃ F ₇		
Q34	34-12	3-I	H i-Pr		H 3-Me-5-i-C ₃ F ₇		
Q34	34-13	3-I	H i-Pr		H 6-Me-5-C ₂ F ₅		
Q34	34-14	3-I	H i-Pr		H 6-Me-5-n-C ₂ F ₅		
Q34	34-15	3-I	H i-Pr		H 6-Me-5-i-C ₃ F ₇		
Q34	34-16	3-I	H t-Bu		H 5-i-C ₃ F ₇		
Q34	34-17	3-I	H t-Bu		H 5-C ₂ F ₅		
Q34	34-18	3-I	H t-Bu		H 5-n-C ₃ F ₇		
Q34	34-19	3-I	H t-Bu		H 3-Me-5-i-C ₃ F ₇		
Q34	34-20	3-I	H CH(CH ₃)CH ₂ SCH ₃		H 3-Me-5-i-C ₃ F ₇		
Q34	34-21	3-I	H CH(CH ₃)CH ₂ SOCH ₃		H 3-Me-5-i-C ₃ F ₇		
Q34	34-22	3-I	H CH(CH ₃)CH ₂ SO ₂ CH ₃		H 3-Me-5-i-C ₃ F ₇		
Q34	34-23	3-I	H C(CH ₃) ₂ CH ₂ SCH ₃		H 3-Me-5-i-C ₃ F ₇		

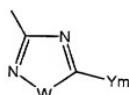
Table 11 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	η_{sp} (°C)
Q34	34-24	3-I	H	C(CH ₃) ₂ CH ₂ SOCH ₃	H	3-Me-5-i-C ₃ F ₇	
Q34	34-25	3-I	H	C(CH ₃) ₂ CH ₂ SO ₂ CH ₃	H	3-Me-5-i-C ₃ F ₇	
Q34	34-26	3-I	H	CH(CH ₃)CH ₂ NHAc	H	3-Me-5-i-C ₃ F ₇	
Q34	34-27	3-I	H	C(CH ₃) ₂ CH ₂ NHAc	H	3-Me-5-i-C ₃ F ₇	
Q34	34-28	3-I	H	CH(CH ₃)CH ₂ CH ₂ OCH ₃	H	3-Me-5-i-C ₃ F ₇	
Q34	34-29	3-I	H	C(CH ₃) ₂ CH ₂ CH ₂ OCH ₃	H	3-Me-5-i-C ₃ F ₇	
Q34	34-30	3-I	Et	Et		H H	144
Q34	34-31	3-I	Et	Et		H 3-Me-5-C ₂ F ₅	
Q34	34-32	3-I	Et	Et		H 3-Me-5-n-C ₃ F ₇	
Q34	34-33	3-I	Et	Et		H 3-Me-5-i-C ₃ F ₇	
Q34	34-34	3-I	Et	Et		H 5-Cl	
Q34	34-35	3-I	Et	Et		H 5-Br	
Q34	34-36	3-I	Et	Et		H 5-n-C ₃ F ₇	
Q34	34-37	3-CF ₃	H	i-Pr		H 3-Me-5-C ₂ F ₅	
Q34	34-38	3-Ph	H	i-Pr		H 3-Me-5-n-C ₃ F ₇	
Q34	34-39	3-SOCF ₃	H	i-Pr		H 3-Me-5-i-C ₃ F ₇	
Q34	34-40	3-C ₂ F ₅	H	i-Pr		H 3-Me-5-C ₂ F ₅	
Q34	34-41	3-I-4-Cl	H	i-Pr		H 3-Me-5-n-C ₃ F ₇	
Q34	34-42	3-I-4-CF ₃	H	i-Pr		H 3-Me-5-i-C ₃ F ₇	
Q34	34-43	3-CF ₃ -4-Cl	H	i-Pr		H 3-Me-5-C ₂ F ₅	
Q34	34-44	3-OCF ₂ O-4	H	i-Pr		H 3-Me-5-n-C ₃ F ₇	
Q34	34-45	3-OCF ₂ CF ₂ O-4	H	i-Pr		H 3-Me-5-i-C ₃ F ₇	
Q34	34-46	3-I	H	Et		H 5-i-C ₃ F ₇	175

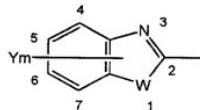
Table 11 (Continued)

Q	No.	Xn	R ¹	R ²	R ³	Ym	mp (°C)
Q3	3- 1	3-I	H	i-Pr	H	H	
Q7	7- 1	3-I	H	i-Pr	H	H	
Q11	11- 1	3-I	H	i-Pr	H	H	
Q14	14- 1	3-I	H	i-Pr	H	H	
Q15	15- 1	3-I	H	i-Pr	H	H	185
Q18	18- 1	3-I	H	i-Pr	H	H	
Q20	20- 1	3-I	H	i-Pr	H	H	

Q :



Q16



Q43

Table 12 (Z¹ = Z² = O)

Q	No.	Xn	R ¹	R ²	R ³	W	Ym	Property, Mp (°C)
Q16	16- 1	3-Cl	H	i-Pr	H	N-i-Pr	SMe	Paste
Q16	16- 2	3-Cl	H	i-Pr	H	N-n-Pr	SMe	Paste
Q44	43- 1	H	H	i-Pr	H	S	6-Cl	47

EXAMPLES

Next, typical examples of the present invention are shown below. The invention is by no means limited by these examples.

5 Production Example 1

(1-1) Production of N-(4-methyl-3-trifluoromethyl-isoxazol-5-yl)-3-iodophthalimide

In 20 ml of acetic acid, 0.6 g of 3-iodophthalic anhydride and 0.44 g of 5-amino-4-methyl-10 3-trifluoromethyl-isoxazole were dissolved and reacted for 9 hours with heating under reflux. After completion of the reaction, the solvent was distilled off under reduced pressure, and the residue was dissolved in ethyl acetate, washed with dilute hydrochloric acid, 15 saturated aqueous solution of sodium bicarbonate and saturated aqueous solution of sodium chloride, and then dried on sodium sulfate. After distilling off the solvent under reduced pressure, the residue was purified by silica gel column chromatography using a 20 3/1 mixture of hexane and ethyl acetate as an eluent to obtain 0.71 g of the objective product.

Property: m.p. 105°C; Yield: 69%

(1-2) Production of N¹-(4-methyl-3-trifluoromethyl-isoxazol-5-yl)-N²-isopropyl-3-iodophthalamide (Compound

25 No. Q6-8)

In 50 ml of dioxane was dissolved 1.06 g of N-(4-methyl-3-trifluoromethylisoxazol-5-yl)-3-iodophthaimide. Then, 0.4 g of isopropylamine was

added to the solution obtained above and stirred at room temperature for 3 hours. After completion of the reaction, the solvent was distilled off under reduced pressure, and the residue was purified by silica gel 5 column chromatography using a 2/1 mixture of hexane and ethyl acetate as an eluent to obtain 0.32 g of the objective product.

Property: m.p. 103°C; Yield: 26%

Production Example 2

10 (2-1) Production of N¹-[2-(1,1-dimethylethyl)-1,3,4-thiadiazol-4-yl]-N²,N²-diethyl-3-iodophthalamide
(Compound No. Q19-34)

In 20 ml of tetrahydrofuran were dissolved 0.5 g of N,N-diethyl-3-iodophthalic acid 2-amide and 15 0.27 g of 5-amino-2-(1,1-dimethylethyl)-1,3,4-thiadiazole. After adding 0.28 g of diethylphosphoryl cyanide and 0.18 g of triethylamine, a reaction was carried out for 7 hours with heating under reflux.

After completion of the reaction, ethyl acetate was 20 added to the reaction mixture, and the resulting ethyl acetate solution was washed with dilute hydrochloric acid, saturated aqueous solution of sodium bicarbonate and saturated aqueous solution of sodium chloride, and dried on sodium sulfate. After distilling off the 25 solvent, the residue was purified by silica gel column chromatography using 3/1 mixture of hexane and ethyl acetate to obtain 0.11 g of the objective product.

Property: m.p. 59°C; Yield: 16%

Production Example 3

(3-1) Production of N¹-(4-methyl-2-heptafluoroisopropyl-pyridin-5-yl)-N²-(1-methyl-2-methylthioethyl)-3-

5 iodophthalimide (Compound No. Q27-144)

In 4 ml of acetonitrile were dissolved 0.37 g of N-(1-methyl-2-methylthioethyl)-3-iodophthalic acid isoimide and 0.28 g of 5-amino-4-methyl-2-heptafluoroisopropyl-pyridine. After adding a catalytic quantity 10 of trifluoroacetic acid, the resulting mixture was stirred at room temperature for 30 minutes. The resulting crystal was collected by filtration, and there was obtained 0.28 g of the objective product.

Property: m.p. 225°C; Yield: 44%

15 Production Example 4: Production of 2-amino-3-methyl-6-pentafluoroethylpyridine (Compound No. IV-1)

To 20 ml of dimethyl sulfoxide were added 2.34 g (0.01 mol) of 2-amino-5-iodo-3-methylpyridine, 2.5 g of powdered metallic copper and 3.7 g (0.015 mol) 20 of iodopentafluorethane. The mixture was kept at 110°C and vigorously stirred for 6 hours. After cooling the reaction mixture to room temperature, the mixture was poured into 500 ml of ice water and thoroughly stirred. The insoluble matter was filtered off, and the objective product was extracted from the filtrate with 300 25 ml of ethyl acetate. The extract solution was washed

with water, dried on anhydrous sodium sulfate, and concentrated under reduced pressure. Purification of the residue by column chromatography using 3/7 mixture of ethyl acetate and hexane as an eluent gave 1.1 g of
5 the objective product (yield 20%).

¹H-NMR [δ (CDCl₃)]: 2.17 (s,3H), 4.82 (br,2H),
7.42 (d,1H), 8.16 (s,1H),

Production Example 5: Production of 3-amino-2-methoxy-
6-(heptafluoropropan-2-yl)-pyridine (Compound No. IV-
10 15)

To 20 ml of methyl t-butyl ether were added 3.2 g (0.026 mol) of 3-amino-2-methoxypyridine, 0.6 g of triethylbenzylammonium chloride, 2.0 g of sodium carbonate and 10.0 g (0.031 mol) of 2-iodoheptafluoro-
15 propane. While stirring the mixture at 30°C, a solution of 2.8 of sodium hydrosulfite in 10 ml water was dropwise added thereto. After the dropping, the resulting mixture was reacted at room temperature for 20 hours, after which the organic layer was separated,
20 washed with water and dried on anhydrous sodium sulfate, and the solvent was distilled off under reduced pressure. Purification of the residue by column chromatography using 3/7 mixture of ethyl acetate and hexane as an eluent gave 2.0 g of the
25 objective product (yield 26%).

¹H-NMR [δ (CDCl₃)]: 3.96 (s,3H), 4.03 (br,2H),
6.91 (d,1H), 7.10 (dd,1H)

Production Example 6: Production of 3-amino-6-(1,1,1,3,3,3-hexafluoroisopropoxy)pyridine (Compound No. IV-27)

Sodium hydride (2.6 g) was portionwise added
5 to a solution of 11.3 g of 1,1,1,3,3,3-hexafluoro-2-propanol in 50 ml tetrahydrofuran at a temperature not exceeding 5°C, and stirred at the same temperature as above for 30 minutes. Then, 4.7 g of 2-chloro-5-nitropyridine was added and stirred at room temperature
10 for 12 hours. The reaction mixture was poured into 200 ml of ice water and extracted with 300 ml of ethyl acetate. The extract solution was washed with water, dried on anhydrous sodium sulfate and concentrated. Purification of the residue by column chromatography
15 using 1/10 mixture of ethyl acetate and hexane as an eluent gave 6.2 g of 2-(1,1,1,3,3,3-hexafluoro-isopropoxy)-5-nitrobenzene (yield 64%).

To 20 ml of acetic acid were added 4.4 g of the 2-(1,1,1,3,3,3-hexafluoroisopropoxy)-5-nitrobenzene
20 obtained above and 4.2 g of electrolytic iron. The resulting mixture was stirred at 60-65°C for 30 minutes. The reaction mixture was cooled and neutralized with 6N aqueous solution of sodium hydroxide, the insoluble matter was filtered off, and
25 the filtrate was extracted with 300 ml of t-butyl methyl ether. The extract solution was washed with aqueous solution of sodium chloride, dried on anhydrous sodium sulfate and concentrated. Purification of the

residue by column chromatography using 2/3 mixture of ethyl acetate and hexane as an eluent gave 3.6 g of 3-amino-6-(1,1,1,3,3-hexafluoroisopropoxy)pyridine (yield 92%).

- 5 The agrohorticultural insecticides containing the phthalamide derivative of formula (I) of the present invention as an active ingredient are suitable for controlling various insect pests such as agrohorticultural insect pests, stored grain insect pests,
- 10 sanitary insect pests, nematodes, etc., which are injurious to paddy rice, fruit trees, vegetables, other crops, flowers, ornamental plants, etc. They have a marked insecticidal effect, for example, on LEPIDOPTERA including summer fruit tortrix (Adoxophyes orana)
- 15 fasciata), smaller tea tortrix (Adoxophyes sp.), Manchurian fruit moth (Grapholita inopinata), oriental fruit moth (Grapholita molesta), soybean pod border (Leguminovora glycinivorella), mulberry leafroller (Olethreutes mori), tea leafroller (Caloptilia
- 20 thevivora), Caloptilia sp. (Caloptilia zachrysa), apple leafminer (Phyllonorycter ringoniella), pear barkminer (Splerrina astaurota), common white (Piers rapae crucivora), tobacco budworm (Heliothis sp.), codling moth (Laspeyresia pomonella), diamondback moth
- 25 (Plutella xylostella), apple fruit moth (Argyresthia conjugella), peach fruit moth (Carposina nipponensis), rice stem borer (Chilo suppressalis), rice leafroller (Chaphalocrocis medinalis), tobacco moth (Ephestia

- elutella), mulberry pyralid (Glyphodes pyloalis), yellow rice borer (Scirpophaga incertulas), rice skipper (Parnara guttata), rice armyworm (Pseudaletia separata), pink borer (Sesamia inferens), common
- 5 cutworm (Spodoptera litura), beet armyworm (Spodoptera exigua), etc.; HEMIPTERA including aster leafhopper (Macrostelus fascifrons), green rice leafhopper (Nephrotettix cincticeps), brown rice planthopper (Nilaparvata lugens), whitebacked rice planthopper
- 10 (Sogatella furcifera), citrus psylla (Diaphorina citri), grape whitefly (Aleurolobus taonabae), sweetpotato whitefly (Bemisia tabaci), greenhouse whitefly (Trialeurodes vaporariorum), turnip aphid (Lipaphis erysimi), green peach aphid (Myzus persicae),
- 15 Indian wax scale (Ceroplastes ceriferus), cottony citrus scale (Pulvinaria aurantii), camphor scale (Pseudaonidia duplex), san Jose scale (Comstockaspis perniciosa), arrowhead scale (Unapsis yanonensis), etc.; TYLENCHIDA including soybean beetle (Anomala rufocuprea), Japanese beetle (Popillia japonica), tobacco beetle (Lasiocerderma serricorne), powderpost beetle (Lyctus brunneus), twenty-eight-spotted ladybird (Epilachna vigintiotpunctata), azuki bean weevil (Callosobruchus chinensis), vegetable weevil
- 20 (Listroderes costirostris), maize weevil (Sitophilus zeamais), boll weevil (Anthonomus gradis gradis), rice water weevil (Lissorhoptrus oryzophilus), cucurbit leaf beetle (Aulacophora femoralis), rice leaf beetle

(Oulema oryzae), striped flea beetle (Phyllotreta striolata), pine shoot beetle (Tomicus piniperda), Colorado potato beetle (Leptinotarsa decemlineata), Mexican bean beetle (Epilachna varivestis), corn 5 rootworm (Diabrotica sp.), etc.; DIPTERA including (Dacus(Zeugodacus) cucurbitae), oriental fruit fly (Dacus(Bactrocera) dorsalis), rice leafminer (Agnomyza oryzae), onion maggot (Delia antiqua), seedcorn maggot (Delia platura), soybean pod gall midge (Asphondylia sp.), muscid fly (Musca domestica), house mosquito (Culex pipiens pipiens), etc.; and TYLENCHIDA including root-lesion nematode (Pratylenchus sp.), coffee root-lesion nematode (Pratylenchus coffeeae), potato cyst nematode (Globodera rostochiensis), root-knot nematode 10 15 (Meloidogyne sp.), citrus nematode (Tylenchulus semipenetrans), Aphelenchus sp. (Aphelenchus avenae), chrysanthemum foliar (Aphelenchoïdes ritzemabosi), etc.

The agrohorticultural agent and particularly the agrohorticultural insecticide containing the 20 phthalamide derivative represented by formula (I) of the present invention has a marked controlling effect on the above-exemplified insect pests, sanitary pests and/or nematodes, which are injurious to paddy field crops, upland crops, fruit trees, vegetables and other 25 crops, flowers and ornament plants, and the like. Therefore, the desired effect of the agrohorticultural insecticide of the present invention can be exhibited by applying the insecticide to the paddy field water,

stalks and leaves or soil of paddy field, upland field, fruit trees, vegetables, other crops or flowers and ornament plants at a season at which the insect pests, sanitary pests or nematodes are expected to appear,

- 5 before their appearance or at the time when their appearance is confirmed.

In general, the agrohorticultural agent of the present invention is used after being prepared into conveniently usable forms according to ordinary manner

- 10 for preparation of agrochemicals.

That is, the phthalamide derivative of formula (I) and an appropriate carrier are blended optionally together with an adjuvant in a proper proportion and prepared into a suitable preparation
15 form such as suspension, emulsifiable concentrate, soluble concentrate, wettable powder, granules, dust or tablets through dissolution, separation, suspension, mixing, impregnation, adsorption or sticking.

The inert carrier used in the present invention may be either solid or liquid. As the solid carrier, soybean flour, cereal flour, wood flour, bark flour, saw dust, powdered tobacco stalks, powdered walnut shells, bran, powdered cellulose, extraction residues of vegetables, powdered synthetic polymers or
25 resins, clay (e.g. kaolin, bentonite and acid clay), talc (e.g. talc and pyrophyllite), silica materials (e.g. diatomaceous earth, siliceous sand, mica, white carbon, i.e. synthetic high-dispersion silicic acid,

also called finely divided hydrated silica or hydrated silicic acid, some of the commercially available products contain calcium silicate as the major component), activated carbon, powdered sulfur, pumice, 5 calcined diatomaceous earth, ground brick, fly ash, sand, calcium carbonate, calcium phosphate and other inorganic or mineral powders, chemical fertilizers such as ammonium sulfate, ammonium phosphate, ammonium nitrate, urea, ammonium chloride and the like, and 10 compost. These carriers may be used either alone or as a mixture of two or more carriers.

The liquid carrier is that which itself has a solubility or which is without such solubility but is capable of dispersing an active ingredient with the aid 15 of an adjuvant. The following are typical examples of the liquid carrier and can be used alone or as a mixture thereof. Water; alcohols such as methanol, ethanol, isopropanol, butanol and ethylene glycol; ketones such as acetone, methyl ethyl ketone, methyl 20 isobutyl ketone, diisobutyl ketone and cyclohexanone; ethers such as ethyl ether, dioxane, cellosolve, dipropyl ether and tetrahydrofuran; aliphatic hydrocarbons such as kerosene and mineral oil; aromatic hydrocarbons such as benzene, toluene, xylene, solvent 25 naphtha and alkynaphthalene; halogenated hydrocarbons such as dichlorethane, chloroform, carbon tetrachloride and chlorobenzene; esters such as ethyl acetate, diisopropyl phthalate, dibutyl phthalate and dioctyl

phthalate; amides such as dimethylformamide, diethyl-formamide and dimethylacetamide; nitriles such as acetonitrile; and dimethyl sulfoxide.

The following are typical examples of the
5 adjuvant, which are used depending upon purposes and
used alone or in combination of two or more adjuvants
in some cases, or need not to be used at all.

To emulsify, disperse, dissolve and/or wet an
active ingredient, a surfactant is used. As the
10 surfactant, there can be exemplified polyoxyethylene
alkyl ethers, polyoxyethylene alkylaryl ethers,
polyoxyethylene higher fatty acid esters, polyoxy-
ethylene resinates, polyoxyethylene sorbitan
monolaurate, polyoxyethylene sorbitan monooleate,
15 alkylarylsulfonates, naphthalene-sulfonic acid
condensation products, ligninsulfonates and higher
alcohol sulfate esters.

Further, to stabilize the dispersion of an
active ingredient, tackify it and/or bind it, there may
20 be used adjuvants such as casein, gelatin, starch,
methyl cellulose, carboxymethyl cellulose, gum arabic,
polyvinyl alcohols, turpentine, bran oil, bentonite and
ligninsulfonates.

To improve the flowability of a solid
25 product, there may be used adjuvants such as waxes,
stearates and alkyl phosphates.

Adjuvants such as naphthalenesulfonic acid
condensation products and polycondensates of phosphates

may be used as a peptizer for dispersible products.

Adjuvants such as silicone oil may also be used as a defoaming agent.

The content of the active ingredient may be
5 varied according to the need, in a range of 0.01 to 80 parts by weight per 100 parts by weight of the preparation. In dusts or granules, the suitable content thereof is from 0.01 to 50% by weight. In emulsifiable concentrate and flowable wettable powder, too, the
10 suitable content is from 0.01 to 50% by weight.

The agrohorticultural insecticide of the present invention is used to control a variety of insect pests in the following manner. That is, it is applied to a crop on which the insect pests are
15 expected to appear or a site where appearance of the insect pests is undesirable, as it is or after being properly diluted with or suspended in water or the like, in an amount effective for control of the insect pests.

20 The applying dosage of the agrihorticultural insecticide of the present invention is varied depending upon various factors such as a purpose, insect pests to be controlled, a growth state of a plant, tendency of insect pests appearance, weather;
25 environmental conditions, a preparation form, an application method, an application site and an application time. It may be properly chosen in a range of 0.1 g to 10 kg (in terms of active ingredient compound) per

10 ares depending upon purposes.

The agrihorticultural insecticide of the present invention may be used in admixture with other agricultural and horticultural disease or pest controllers in order to expand both spectrum of controllable diseases and insect pest species and the period of time when effective applications are possible or to reduce the dosage.

Next, typical formulation examples and test 10 examples of the invention are presented below. The present invention is by no means limited by these examples.

In the formulation examples, the term "parts" means "parts by weight".

15 Formulation Example 1

Each compound listed in Tables 2 to 12	50 parts
Xylene	40 parts
Mixture of polyoxyethylene nonylphenyl ether and calcium alkylbenzenesulfonate	10 parts

20 An emulsifiable concentrate was prepared by mixing uniformly the above ingredients to effect dissolution.

Formulation Example 2

Each compound listed in Tables 2 to 12	3 parts
Clay powder	82 parts
Diatomaceous earth powder	15 parts

A dust was prepared by mixing uniformly and grinding the above ingredients.

Formulation Example 3

	Each compound listed in Tables 2 to 12	5 parts
5	Mixed powder of bentonite and clay	90 parts
	Calcium ligninsulfonate	5 parts

Granules were prepared by mixing the above ingredients uniformly, and kneading the resulting mixture together with a suitable amount of water, 10 followed by granulation and drying.

Formulation Example 4

	Each compound listed in Tables 2 to 12	20 parts
	Mixture of kaolin and synthetic	
	high-dispersion silicic acid	75 parts
15	Mixture of polyoxyethylene nonylphenyl ether and calcium alkylbenzenesulfonate	5 parts

A wettable powder was prepared by mixing uniformly and grinding the above ingredients.

Test Example 1: Insecticidal effect on diamond back 20 moth (Plutella xylostella)

Adult diamond back moths were released and allowed to oviposit on a Chinese cabbage seedling. Two days after the release, the seedling having the eggs deposited thereon was immersed for about 30 seconds in 25 a liquid chemical prepared by diluting a preparation

containing each compound listed in Tables 2 to 12 as an active ingredient to adjust the concentration to 1,000 ppm. After air-dryness, it was allowed to stand in a room thermostatted at 25°C. Six days after the
 5 immersion, the hatched insects were counted. The mortality was calculated according to the following equation and the insecticidal effect was judged according to the criterion shown below. The test was carried out with triplicate groups of 10 insects.

$$10 \quad \text{Corrected mortality}(\%) = \frac{\text{Number of hatched insects in untreated group}}{\text{Number of hatched insects in treated group}} \times 100$$

Criterion:

- A --- Mortality 100%
- B --- Mortality 99-90%
- C --- Mortality 89-80%
- 15 D --- Mortality 79-50%

In the test mentioned above, the compounds which exhibited an activity ranking B or higher were as follows:

Q1-12, Q1-41, Q1-42, Q4-6, Q4-8, Q4-12, Q4-45, Q6-6,
 20 Q6-8, Q8-1, Q8-2, Q8-3, Q8-5, Q8-11, Q8-13, Q8-14, Q8-15, Q8-53, Q9-15, Q10-7, Q15-1, Q26-1, Q26-11, Q26-29, Q26-30, Q26-31, Q26-32, Q26-33, Q26-43, Q27-29, Q27-30, Q27-31, Q27-32, Q27-81, Q27-98, Q27-124, Q27-125, Q27-

126, Q27-127, Q27-128, Q27-129, Q27-130, Q27-131, Q27-
132, Q27-133, Q27-134, Q27-135, Q27-136, Q27-137, Q27-
138, Q27-139, Q27-140, Q27-141, Q27-142, Q27-143, Q27-
144, Q27-145, Q27-150, Q27-151, Q27-153, Q27-155, Q27-
5 164, Q27-230, Q27-231, Q27-232, Q27-233, Q27-234, Q27-
235, Q27-236, Q27-238, Q27-239, Q27-240, Q27-241, Q27-
242, Q27-243, Q27-244, Q27-245, Q27-246, Q27-247, Q27-
248 to Q27-265, Q27-267, Q27-268, Q27-270, Q27-273 to
Q27-280, Q27-282 to Q27-284, Q27-289, Q27-297, Q27-298,
10 Q27-305 to Q27-309, Q27-316 to Q27-318, Q27-323 to Q27-
327, Q27-332, Q27-334, Q27-335, Q27-336 to Q27-339,
Q27-347, Q27-352, Q27-353, Q27-354, Q27-355, Q27-359,
Q27-360, Q27-378, Q27-384, Q27-387, Q27-388, Q27-391,
Q27-393, Q27-396, Q27-397, Q27-402 to Q27-405, Q27-407,
15 Q27-413, Q27-414, Q27-439, Q27-449 to Q27-457, Q27-459
to Q27-469, Q32-11, Q32-19, Q33-1, Q33-10, Q34-30, Q34-
46 and Q42-1.

Test Example 2: Insecticidal effect on Common cutworm
(Spodoptera litura)

20 A piece of cabbage leaf (cultivar; Shikidori)
was immersed for about 30 seconds in a liquid chemical
prepared by diluting a preparation containing each
compound listed in Tables 2 to 12 as an active
ingredient to adjust the concentration to 500 ppm.
25 After air-dryness, it was placed in a plastic Petri
dish with a diameter of 9 cm and inoculated with
second-instar larvae of common cutworm, after which the

dish was closed and then allowed to stand in a room thermostatted at 25°C. Eight days after the inoculation, the dead and alive were counted. The mortality was calculated according to the following equation and the insecticidal effect was judged according to the criterion shown in Test Example 1. The test was carried out with triplicate groups of 10 insects.

$$\text{Corrected mortality}(\%) = \frac{\frac{\text{Number of alive larvae in untreated group}}{\text{Number of alive larvae in treated group}} - 1}{\text{Number of alive larvae in untreated group}} \times 100$$

- 10 In the test mentioned above, the compounds which exhibited an activity ranking B or higher were as follows:
- Q26-1, Q26-11, Q26-29, Q26-30, Q26-31, Q26-32, Q26-33,
 Q26-43, Q27-29, Q27-30, Q27-31, Q27-32, Q27-81, Q27-98,
- 15 Q27-124, Q27-125, Q27-126, Q27-127, Q27-128, Q27-129,
 Q27-130, Q27-131, Q27-132, Q27-133, Q27-134, Q27-135,
 Q27-136, Q27-137, Q27-138, Q27-139, Q27-140, Q27-141,
 Q27-142, Q27-143, Q27-144, Q27-145, Q27-150, Q27-151,
 Q27-152, Q27-153, Q27-155, Q27-164, Q27-230, Q27-231,
- 20 Q27-232, Q27-233, Q27-234, Q27-235, Q27-236, Q27-238,
 Q27-239, Q27-240, Q27-241, Q27-242, Q27-243, Q27-244,
 Q27-245, Q27-246, Q27-247, Q27-248 to Q27-265, Q27-267,
 Q27-268, Q27-270, Q27-273 to Q27-280, Q27-282 to Q27-
 284, Q27-289, Q27-297, Q27-298, Q27-305 to Q27-309,

Q27-316 to Q27-318, Q27-323 to Q27-327, Q27-332, Q27-
334, Q27-335, Q27-336 to Q27-339, Q27-347, Q27-352,
Q27-353, Q27-354, Q27-355, Q27-359, Q27-360, Q27-378,
Q27-384, Q27-387, Q27-388, Q27-397, Q27-402 to Q27-405,
5 Q27-407, Q27-413, Q27-414, Q27-439, Q27-459, Q27-466,
Q32-19 and Q34-46.

Test Example 3: Insecticidal effect on rice leafroller
(Cnaphalocrosis medinalis)

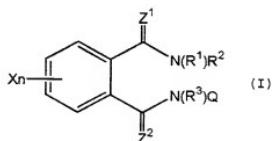
The lamina of a rice plant at the 6 to 8 leaf
10 stage was immersed for about 30 seconds in a liquid
chemical prepared by diluting a preparation containing
each compound listed in Tables 2 to 12 as an active
ingredient to adjust the concentration to 500 ppm.
After air-dryness, the lamina was placed in a plastic
15 Petri dish with a diameter of 9 cm whose bottom had
been covered with a wetted filter paper. The lamina
was inoculated with third-instar larvae of rice
leafroller, after which the dish was allowed to stand
in a room thermostatted at 25°C and having a humidity
20 of 70%. Four days after the inoculation, the dead and
alive were counted and the insecticidal effect was
judged according to the criterion shown in Test Example
1. The test was carried out with triplicate groups of
10 insects.

25 In the test mentioned above, compounds which
exhibited an activity ranking B or higher were as
follows:

Q26-1, Q26-29, Q26-30, Q26-31, Q26-32, Q26-33, Q27-29,
Q27-30, Q27-31, Q27-32, Q27-81, Q27-98, Q27-124, Q27-
125, Q27-126, Q27-127, Q27-128, Q27-129, Q27-130, Q27-
131, Q27-132, Q27-133, Q27-134, Q27-135, Q27-136, Q27-
5 137, Q27-138, Q27-139, Q27-140, Q27-141, Q27-142, Q27-
143, Q27-144, Q27-145 and Q27-164.

CLAIMS

1. A phthalamide derivative represented by the following general formula (I):



wherein R¹, R² and R³, which may be same or different, represent hydrogen atom, C₃-C₆ cycloalkyl group, halo C₁-C₆ cycloalkyl group or -A¹-(G)_r (in this formula, A¹ represents C₁-C₆ alkylene group, C₃-C₆ alkenylene group or C₃-C₆ alkynylene group; G, which may be same or different, represents hydrogen atom, halogen atom, cyano group, nitro group, halo C₁-C₆ alkyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy carbonyl group, di(C₁-C₆) alkoxyphosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, di(C₁-C₆) alkoxythiophosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, diphenylphosphino group, diphenylphosphono group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆

alkylsulfonyl group, heterocyclic group (as used herein, the term "heterocyclic group" means pyridyl group, pyridine-N-oxide group, pyrimidinyl group, furyl group, tetrahydrofuryl group, thienyl group, tetrahydrothienyl group, tetrahydropyran group, oxazolyl group, isoxazolyl group, oxadiazolyl group, thiazolyl group, isothiazolyl group, thiadiazolyl group, imidazolyl group, triazolyl group or pyrazolyl group), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -Z³-R⁴ (in this formula, Z³ represents -O-, -S-, -SO-, -SO₂-, -N(R⁵)- (in this formula, R⁵ represents hydrogen atom, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxycarbonyl group, phenylcarbonyl group, substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkoxycarbonyl group, substituted

phenyl C_1-C_4 alkoxy carbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, C_1-C_6 alkylsulfonyl group or halo C_1-C_6 alkylsulfonyl group), $-C(=O)-$ or $-C(=NOR^6)-$ (in this formula, R^6 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl C_1-C_4 alkyl group, or substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group), and R^4 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy C_1-C_6 alkyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, formyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6

alkoxycarbonyl group, mono (C_1-C_6) alkylaminocarbonyl group, di(C_1-C_6) alkylaminocarbonyl group in which the (C_1-C_6) alkyl groups may be same or different, mono(C_1-C_6) alkylaminothiocarbonyl group, di(C_1-C_6) alkylaminothiocarbonyl group in which the (C_1-C_6) alkyl groups may be same or different, di(C_1-C_6) alkoxyphosphoryl group in which the (C_1-C_6) alkoxy groups may be same or different, di(C_1-C_6) alkoxythiophosphoryl group in which the (C_1-C_6) alkoxy groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl (C_1-C_4) alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or

different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group); and r represents an integer of 1 to 4; further, R^1 and R^2 may be taken conjointly to form 4- to 7-membered rings which may be intercepted by 1 to 3, same or different oxygen atom, sulfur atom or nitrogen atom;

X , which may be same or different, represents halogen atom, cyano group, nitro group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group,

halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group,
halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group
and halo C₁-C₆ alkylsulfonyl group, or -A²-R' [in this
formula, A² represents -O-, -S-, -SO-, -SO₂-, -NR⁸- (in
this formula R⁸ represents hydrogen atom, C₁-C₆ alkyl-
carbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆
alkoxycarbonyl group, phenylcarbonyl group, substituted
phenylcarbonyl group having at least one, same or
different substituents selected from the group consist-
ing of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl
group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆
alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆
alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group,
C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl
group, phenyl C₁-C₄ aloxycarbonyl group or substituted
phenyl C₁-C₆ aloxycarbonyl group having, on the ring
thereof, at least one, same or different substituents
selected from the group consisting of halogen atom,
C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy
group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group,
halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group,
halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group
and halo C₁-C₆ alkylsulfonyl group], -C(=O)-, -C(=NOR⁶)-
(in this formula, R⁶ is as defined above), C₁-C₆ alkylene
group, halo C₁-C₆ alkylene group, C₂-C₆ alkenylene group,
halo C₂-C₆ alkenylene group, C₂-C₆ alkynylene group or
halo C₃-C₆ alkynylene group; and

- (1) in cases where A² represents -O-, -S-, -SO-,

-SO₂- or -NR³- (in this formula, R⁸ is as defined above), R⁷ represents hydrogen atom, halo C₁-C₆ cycloalkyl group, halo C₃-C₆ cycloalkenyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A³-R⁹ (in this formula, A³ represents C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₃-C₆ alkenylene group, halo C₃-C₆ alkenylene group, C₃-C₆ alkynylene group or halo C₃-C₆ alkynylene group; and R⁹ represents hydrogen atom, halogen atom, C₁-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy carbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen

atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^4-R^{10}$ (in this formula, A^4 represents $-O-$, $-S-$, $-SO-$, $-SO_2-$ or $-C(=O)-$; and R^{10} represents C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group);

(2) in cases where A^2 represents $-C(=O)-$ or

-C(=NOR⁶)- (in this formula, R⁶ is as defined above), R⁷ represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₂-C₆ alkenyl group, halo C₂-C₆ alkenyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, mono(C₁-C₆) alkylamino group, di(C₁-C₆) alkylamino group in which the (C₁-C₆) alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenylamino group, substituted phenylamino group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl

group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group; and

(3) in cases where A^2 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group, R^7 represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy carbonyl group, tri(C_1-C_6) alkylsilyl group in which the (C_1-C_6) alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkyl-

sulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^6-R^{11}$ (in this formula, A^6 represents $-O-$, $-S-$, $-SO-$ or $-SO_2-$; and R^{11} represents C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^6-R^{12}$ (in this formula, A^6 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and R^{12} represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group,

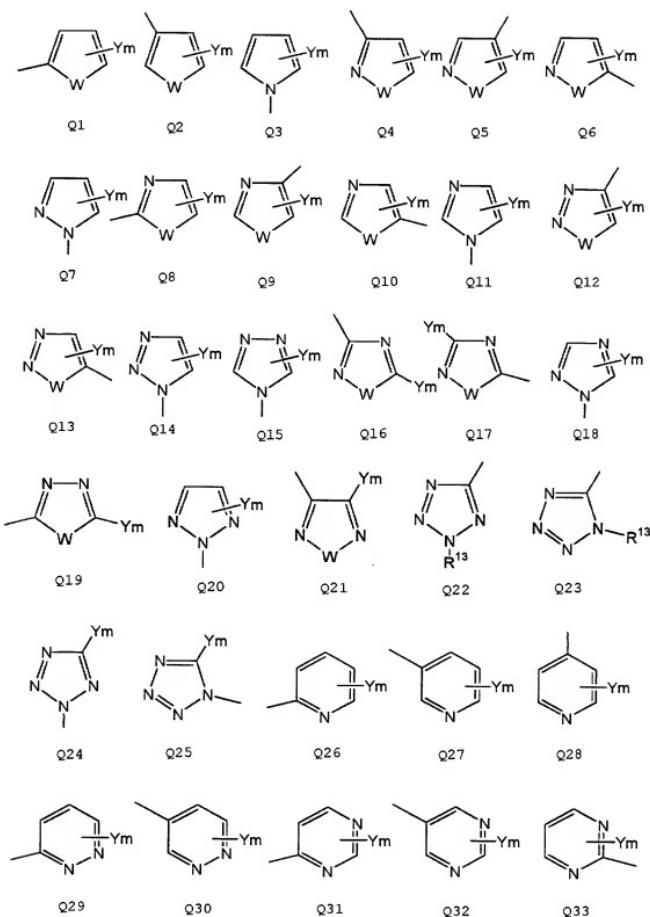
C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenoxy group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different

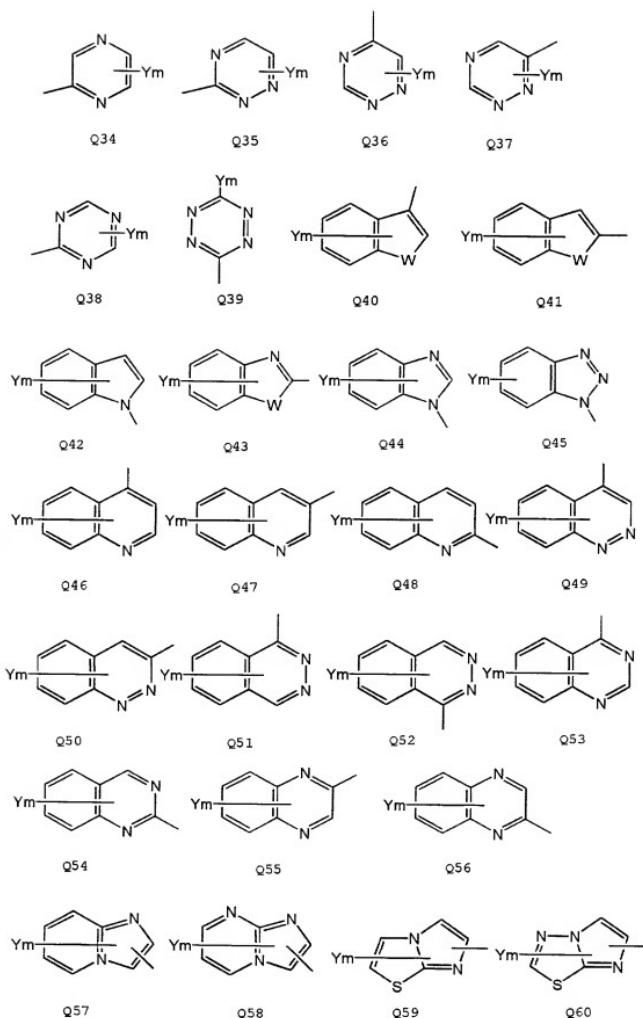
substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group));

n represents an integer of 0 to 4; further, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring (as used herein, the term fused ring means naphthalene, tetrahydronaphthalene, indene, indane, quinoline, quinazoline, chroman, isochroman, indole, indoline, benzodioxane, benzodioxole, benzofuran, dihydrobenzofuran, benzothiophene, dihydrobenzothiophene, benzoxazole, benzothiazole, benzimidazole or indazole), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group,

group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group;

Q represents an N-, S- or O-containing, optionally substituted, heterocyclic group or fused heterocyclic group, selected from the group consisting of the following formulas Q1 to Q60;





(in these formulas, Y, which may be same or different, represents halogen atom, cyano group, nitro group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A²-R⁷ (in this formula, A² and R⁷ are as defined above); m represents an integer of 0 to 6; R¹³ in the formula Q22 and Q23 represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ alkynyl group, halo C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy C₁-C₆ alkyl group, halo C₁-C₆ alkoxy C₁-C₆ alkyl group, C₁-C₆ alkylthio C₁-C₆ alkyl group, halo C₁-C₆ alkylthio C₁-C₆

alkyl group, C₁-C₆ alkylsulfinyl C₁-C₆ alkyl group, halo C₁-C₆ alkylsulfinyl C₁-C₆ alkyl group, C₁-C₆ alkylsulfonyl C₁-C₆ alkyl group, halo C₁-C₆ alkylsulfonyl C₁-C₆ alkyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkyl group, substituted phenyl C₁-C₄ alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl carbonyl group, or substituted phenyl carbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group,

C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group);

alternatively, Y may be taken conjointly with adjacent carbon atom on the ring to form a fused ring (the fused ring is as defined above), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group

and halo C₁-C₆ alkylsulfonyl group;

W represents O, S or N-R¹³ (in this formula, R¹³ is as defined above); and Z¹ and Z² represent oxygen atom or sulfur atom;

provided that when X, R¹ and R³ simultaneously represent hydrogen atom, Z¹ and Z² simultaneously represent oxygen atom, Q represents Q27, and Y is a chlorine atom of 2-position, then R² is not 1,2,2-trimethylpropyl group.

2. A phthalamide derivative according to Claim 1, wherein R¹, R² and R³, which may be same or different, represent hydrogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group or -A¹ -(G)_r (in this formula, A¹ represents C₁-C₆ alkylene group, C₃-C₆ alkenylene group or C₃-C₆ alkynylene group; G, which may be same or different, represents hydrogen atom, halogen atom, cyano group, nitro group, halo C₁-C₆ alkyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy carbonyl group, di(C₁-C₆) alkoxyphosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, di(C₁-C₆) alkoxythiophosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, diphenylphosphino group, diphenylphosphono group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio

group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkyl-sulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (as used herein, the term "heterocyclic group" means pyridyl group, pyridine-N-oxide group, pyrimidinyl group, furyl group, tetrahydrofuryl group, thienyl group, tetrahydrothienyl group, tetrahydropyran group, oxazolyl group, isoxazolyl group, oxadiazolyl group, thiazolyl group, isothiazolyl group, thiadiazolyl group, imidazolyl group, triazolyl group or pyrazolyl group), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-Z^3-R^4$ (in this formula, Z^3 represents $-O-$, $-S-$, $-SO-$, $-SO_2-$, $-N(R^5)-$ (in this formula, R^5 represents hydrogen atom, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxy carbonyl group, phenylcarbonyl group, substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group,

C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenyl C_1-C_4 alkoxy carbonyl group, substituted phenyl C_1-C_4 alkoxy carbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, C_1-C_6 alkylsulfonyl group or halo C_1-C_6 alkylsulfonyl group), $-C(=O)-$ or $-C(=NOR^6)-$ (in this formula, R^6 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl C_1-C_4 alkyl group, or substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group), and R^4 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy C_1-C_6 alkyl group, C_1-C_6 alkylthio C_1-C_6 alkyl

group, formyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxy carbonyl group, mono(C_1-C_6) alkylaminocarbonyl group, di(C_1-C_6) alkyl-amino carbonyl group in which the (C_1-C_6) alkyl groups may be same or different, mono(C_1-C_6) alkylaminothiocarbonyl group, di(C_1-C_6) alkylaminothiocarbonyl group in which the (C_1-C_6) alkyl groups may be same or different, di(C_1-C_6) alkoxyphosphoryl group in which the (C_1-C_6) alkoxy groups may be same or different, di(C_1-C_6) alkoxythiophosphoryl group in which the (C_1-C_6) alkoxy groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl (C_1-C_4) alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group

(the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group; and r represents an integer of 1 to 4); further, R¹ and R² may be taken conjointly to form 4- to 7-membered rings which may be intercepted by 1 to 3, same or different oxygen atom, sulfur atom or nitrogen atom;

X, which may be same or different, represents halogen atom, cyano group, nitro group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆

alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^2-R^7$ [in this formula, A^2 represents $-O-$, $-S-$, $-SO-$, $-SO_2-$, $-NR^3-$ (in this formula R^8 represents hydrogen atom, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxy carbonyl group, phenyl carbonyl group, substituted phenyl carbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenyl C_1-C_4 alkoxy carbonyl group or substituted phenyl C_1-C_4 alkoxy carbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group], $-C(=O)-$, $-C(=NOR^6)-$ (in this formula, R^6 is as defined above), C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and

(1) in cases where A^2 represents $-O-$, $-S-$, $-SO-$, $-SO_2-$ or $-NR^8-$ (in this formula, R^8 is as defined above), R^7 represents hydrogen atom, halo C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkenyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 sulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^3-R^9$ (in this formula, A^3 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and R^9 represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy carbonyl group, phenyl group, substituted phenyl group having at least one, same or different substit-

uents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A⁴-R¹⁰ (in this formula, A⁴ represents -O-, -S-, -SO-, -SO₂- or -C(=O)-; and R¹⁰ represents C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group));

(2) in cases where A² represents -C(=O)- or
-C(=NOR⁶)- (in this formula, R⁶ is as defined above), R⁷
represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆
alkyl group, C₂-C₆ alkenyl group, halo C₂-C₆ alkenyl
group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl
group, C₁-C₆ alkoxy group, C₁-C₆ alkylthio group,
mono(C₁-C₆) alkylamino group, di(C₁-C₆) alkylamino group
in which the (C₁-C₆) alkyl groups may be same or
different, phenyl group, substituted phenyl group
having at least one, same or different substituents
selected from the group consisting of halogen atom,
C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy
group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group,
halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group,
halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group
and halo C₁-C₆ alkylsulfonyl group, phenylamino group,
substituted phenylamino group having, on the ring
thereof, at least one, same or different substituents
selected from the group consisting of halogen atom,
C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy
group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group,
halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group,
halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group
and halo C₁-C₆ alkylsulfonyl group, heterocyclic group
(the term heterocyclic group is as defined above), or
substituted heterocyclic group (the term heterocyclic
group is as defined above) having at least one, same or
different substituents selected from the group consist-

ing of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group; and

(3) in cases where A^2 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group, R^7 represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy carbonyl group, tri(C_1-C_6) alkylsilyl group in which the (C_1-C_6) alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio

group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkyl-sulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^5-R^{11}$ (in this formula, A^5 represents $-O-$, $-S-$, $-SO-$ or $-SO_2-$; and R^{11} represents C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkyl-sulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkyl-thio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkyl-sulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^6-R^{12}$ (in this formula, A^6 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and R^{12} represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy

group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenoxy group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as

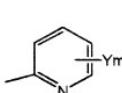
defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group));

n represents an integer of 0 to 4; further, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring (as used herein, the term fused ring means naphthalene, tetrahydronaphthalene, indene, indane, quinoline, quinazoline, chroman, isochroman, indole, indoline, benzodioxane, benzodioxole, benzofuran, dihydrobenzofuran, benzothiophene, dihydrobenzothiophene, benzoxazole, benzothiazole, benzimidazole or indazole), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆

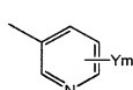
SUBSTITUENT

alkoxy group, $C_1\text{-}C_6$ alkylthio group, halo $C_1\text{-}C_6$ alkylthio group, $C_1\text{-}C_6$ alkylsulfinyl group, halo $C_1\text{-}C_6$ alkylsulfinyl group, $C_1\text{-}C_6$ alkylsulfonyl group and halo $C_1\text{-}C_6$ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, $C_1\text{-}C_6$ alkyl group, halo $C_1\text{-}C_6$ alkyl group, $C_1\text{-}C_6$ alkoxy group, halo $C_1\text{-}C_6$ alkoxy group, $C_1\text{-}C_6$ alkylthio group, halo $C_1\text{-}C_6$ alkylthio group, $C_1\text{-}C_6$ alkylsulfinyl group, halo $C_1\text{-}C_6$ alkylsulfinyl group, $C_1\text{-}C_6$ alkylsulfonyl group and halo $C_1\text{-}C_6$ alkylsulfonyl group;

Q is an optionally substituted, heterocyclic or fused heterocyclic group represented by one of the following formulas Q26 to Q28 and Q32 to Q34;



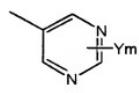
Q26



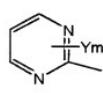
Q27



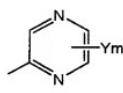
Q28



Q32



Q33



Q34

(in these formulas, Y , which may be same or different, represents halogen atom, cyano group, nitro group, halo $C_1\text{-}C_6$ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substit-

uents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A²-R⁷ (in this formula, A² and R⁷ are as defined above); m represents an integer of 0 to 4;

alternatively, Y may be taken conjointly with adjacent carbon atom on the ring to form a fused ring (the fused ring is as defined above), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl

group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group; and

Z¹ and Z² represent oxygen atom or sulfur atom.

3. A phthalamide derivative according to Claim 2, wherein R¹, R² and R³, which may be same or different, represent hydrogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group or -A¹ -(G)_r (in this formula, A¹ represents C₁-C₆ alkylene group, C₃-C₆ alkenylene group or C₃-C₆ alkynylene group; G, which may be same or different, represents hydrogen atom, halogen atom, cyano group, nitro group, halo C₁-C₆ alkyl group, C₃-C₆

cycloalkyl group, halo C₁-C₆ cycloalkyl group, C₁-C₆ alkoxy carbonyl group, di(C₁-C₆) alkoxy phosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, di(C₁-C₆) alkoxy thiophosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, diphenylphosphino group, diphenylphosphono group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (as used herein, the term "heterocyclic group" means pyridyl group, pyridine-N-oxide group, pyrimidinyl group, furyl group, tetrahydrofuryl group, thienyl group, tetrahydrothienyl group, tetrahydropyranyl group, oxazolyl group, isoxazolyl group, oxadiazolyl group, thiazolyl group, isothiazolyl group, thiadiazolyl group, imidazolyl group, triazolyl group or pyrazolyl group), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆

alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -Z³-R⁴ (in this formula, Z³ represents -O-, -S-, -SO-, -SO₂-, -N(R⁵)- (in this formula, R⁵ represents hydrogen atom, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, phenylcarbonyl group, substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkoxy carbonyl group, substituted phenyl C₁-C₄ alkoxy carbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, C₁-C₆ alkylsulfonyl group or halo C₁-C₆ alkylsulfonyl group), -C(=O)- or -C(=NOR⁶)- (in this formula, R⁶ represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, phenyl C₁-C₄ alkyl group, or substituted phenyl C₁-C₄ alkyl group having, on the ring thereof, at least one, same or different

substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group), and R⁴ represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ alkynyl group, halo C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy C₁-C₆ alkyl group, C₁-C₆ alkylthio C₁-C₆ alkyl group, formyl group, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, mono (C₁-C₆) alkylaminocarbonyl group, di(C₁-C₆) alkylaminocarbonyl group in which the (C₁-C₆) alkyl groups may be same or different, mono(C₁-C₆) alkylaminothiocarbonyl group, di(C₁-C₆) alkylaminothiocarbonyl group in which the (C₁-C₆) alkyl groups may be same or different, di(C₁-C₆) alkoxyphosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, di(C₁-C₆) alkoxythiophosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkyl-

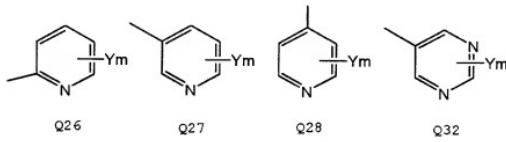
sulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl (C_1-C_4) alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group); and r represents an integer of 1 to 4); further, R^1 and R^2 may be taken conjointly to form 4- to 7-membered rings which may be intercepted by 1 to 3, same or different oxygen atom, sulfur atom or nitrogen atom;

X, which may be same or different, represents halogen atom, cyano group, nitro group, amino group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio

group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, mono(C₁-C₆) alkylamino group, di(C₁-C₆) alkylamino group in which the (C₁-C₆) alkyl groups may be same or different, C₁-C₆ alkylcarbonylamino group, halo C₁-C₆ alkylcarbonylamino group, C₁-C₆ alkoxy carbonyl group, or tri(C₁-C₆) alkylsilylethynyl group in which the (C₁-C₆) alkyl groups may be same or different; and n represents an integer of 0 to 4; further, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring (as used herein, the term fused ring means naphthalene, tetrahydronaphthalene, indene, indane, quinoline, quinazoline, chroman, isochroman, indole, indoline, benzodioxane, benzodioxole, benzofuran, dihydrobenzofuran, benzothiophene, dihydrobenzothiophene, benzoxazole, benzothiazole, benzimidazole or indazole), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆

alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group;

Q represents an optionally substituted, heterocyclic or fused heterocyclic group, having one of the following formulas Q26, Q27, Q28 or Q32:



(in these formulas, Y , which may be same or different, represents halogen atom, cyano group, nitro group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, halo C_1-C_6 alkoxy halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo

C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenoxy group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group; and m represents an integer of 0 to 4;

alternatively, Y may be taken conjointly with

adjacent carbon atom on the ring to form a fused ring (the fused ring is as defined above), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group; and

Z¹ and Z² represent oxygen atom or sulfur

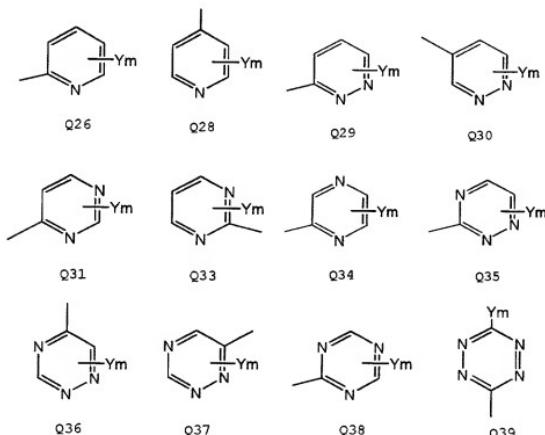
atom.

4. A heterocyclic amine derivative represented by the following general formula (IV'):



wherein:

- (1) in cases where Q' represents one of Q26, Q28-Q31 and Q33-Q39,

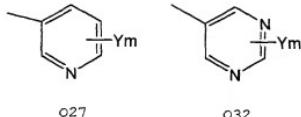


Y, which may be same or different, represents hydrogen atom, halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group or halo C₁-C₆ alkylsulfonyl group, m represents an integer of 1 to 4, and at least one of Y, of which total number is m, is perfluoro C₂-C₆ alkyl

group;

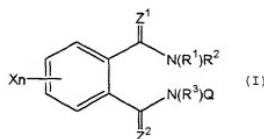
and

(2) in a case where Q' represents Q27 and Q32:



Y, which may be same or different, represents hydrogen atom, halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group or halo C₁-C₆ alkylsulfonyl group, m represents an integer of 1 to 4, and at least one of Y, of which total number is m, is perfluoro C₂-C₆ alkyl group, halo C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy halo C₁-C₆ alkoxy group or halo C₁-C₆ alkylthio group.

5. An agrohorticultural insecticide containing, as an active ingredient thereof, a phthalamide derivative represented by the following general formula (I):



wherein R¹, R² and R³, which may be same or different, represent hydrogen atom, C₃-C₆ cycloalkyl group, halo

C₃-C₆ cycloalkyl group or -Aⁱ -(G)_r (in this formula, Aⁱ represents C₁-C₈ alkylene group, C₃-C₆ alkenylene group or C₃-C₆ alkynylene group; G, which may be same or different, represents hydrogen atom, halogen atom, cyano group, nitro group, halo C₁-C₆ alkyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy carbonyl group, di(C₁-C₆) alkoxy phosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, di(C₁-C₆) alkoxythiophosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, diphenylphosphino group, diphenylphosphono group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (as used herein, the term "heterocyclic group" means pyridyl group, pyridine-N-oxide group, pyrimidinyl group, furyl group, tetrahydrofuryl group, thieryl group, tetrahydrothienyl group, tetrahydropyranyl group, oxazolyl group, isoxazolyl group, oxadiazolyl group, thiazolyl group, isothiazolyl group, thiadiazolyl group, imidazolyl group, triazolyl group or pyrazolyl group), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or

different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -Z³-R⁴ (in this formula, Z³ represents -O-, -S-, -SO-, -SO₂-, -N(R⁵)- (in this formula, R⁵ represents hydrogen atom, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, phenyl carbonyl group, substituted phenyl carbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkoxy carbonyl group, substituted phenyl C₁-C₄ alkoxy carbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, C₁-C₆ alkylsulfonyl group or halo C₁-C₆ alkylsulfonyl group), -C(=O)- or -C(=NOR⁶)- (in this formula, R⁶ represents hydrogen

atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl C_1-C_4 alkyl group, or substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group), and R^4 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy C_1-C_6 alkyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, formyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxy carbonyl group, mono(C_1-C_6) alkylaminocarbonyl group, di(C_1-C_6) alkylaminocarbonyl group in which the (C_1-C_6) alkyl groups may be same or different, mono(C_1-C_6) alkylaminothiocarbonyl group, di(C_1-C_6) alkylaminothiocarbonyl group in which the (C_1-C_6) alkyl groups may be same or different, di(C_1-C_6) alkoxyphosphoryl group in which the (C_1-C_6) alkoxy groups may be same or different, di(C_1-C_6) alkoxythiophosphoryl group in which the (C_1-C_6) alkoxy groups may be same or different, phenyl group, substituted phenyl group having at least one, same or

different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkyl group, substituted phenyl (C₁-C₄) alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group); and r represents an integer of 1 to 4); further, R¹ and R² may be taken conjointly to form 4- to 7-membered rings which may be intercepted by 1 to 3, same or different oxygen atom, sulfur atom or nitrogen atom;

X, which may be same or different, represents halogen atom, cyano group, nitro group, C₁-C₆ cycloalkyl group, halo C₁-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A²-R⁷ [in this formula, A² represents -O-, -S-, -SO-, -SO₂-, -NR⁸- (in this formula R⁸ represents hydrogen atom, C₁-C₆ alkyl-carbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxycarbonyl group, phenylcarbonyl group, substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆

alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkoxy carbonyl group or substituted phenyl C₁-C₄ alkoxy carbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group), -(=O)-, -C(=NOR⁶)- (in this formula, R⁶ is as defined above), C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₂-C₆ alkenylene group, halo C₂-C₆ alkenylene group, C₂-C₆ alkynylene group or halo C₃-C₆ alkynylene group; and

(1) in cases where A² represents -O-, -S-, -SO-, -SO₂- or -NR⁸- (in this formula, R⁸ is as defined above), R⁷ represents hydrogen atom, halo C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkenyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as

defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A³-R⁹ (in this formula, A³ represents C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₃-C₆ alkenylene group, halo C₃-C₆ alkenylene group, C₃-C₆ alkynylene group or halo C₃-C₆ alkynylene group; and R⁹ represents hydrogen atom, halogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy carbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A⁴-R¹⁰ (in this formula, A⁴ represents -O-, -S-, -SO-, -SO₂- or -C(=O)-; and R¹⁰ represents C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substit-

uents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group));

(2) in cases where A² represents -C(=O)- or -C(=NOR⁶)- (in this formula, R⁶ is as defined above), R⁷ represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₂-C₆ alkenyl group, halo C₂-C₆ alkenyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, mono(C₁-C₆) alkylamino group, di(C₁-C₆) alkylamino group in which the (C₁-C₆) alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy

group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenylamino group, substituted phenylamino group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group; and

- (3) in cases where A^2 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group, R^7 represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy carbonyl group, tri(C_1-C_6)

alkylsilyl group in which the (C₁-C₆) alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A⁵-R¹¹ (in this formula, A⁵ represents -O-, -S-, -SO- or -SO₂-; and R¹¹ represents C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆

alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A⁶-R¹² (in this formula, A⁶ represents C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₂-C₆ alkenylene group, halo C₂-C₆ alkenylene group, C₂-C₆ alkynylene group or halo C₃-C₆ alkynylene group; and R¹² represents hydrogen atom, halogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenoxy group, substituted phenoxy group having at least one, same or

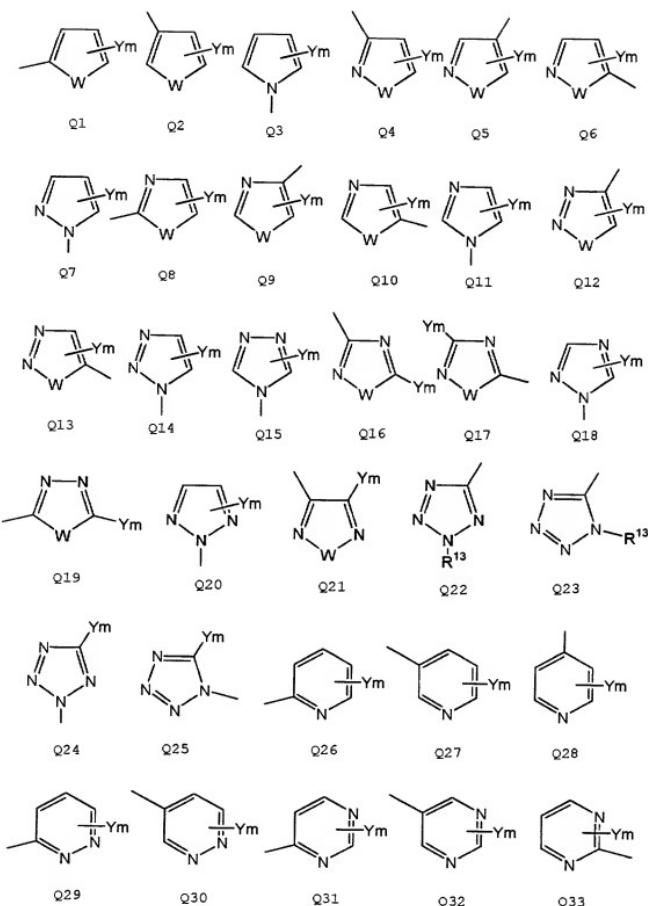
different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group);

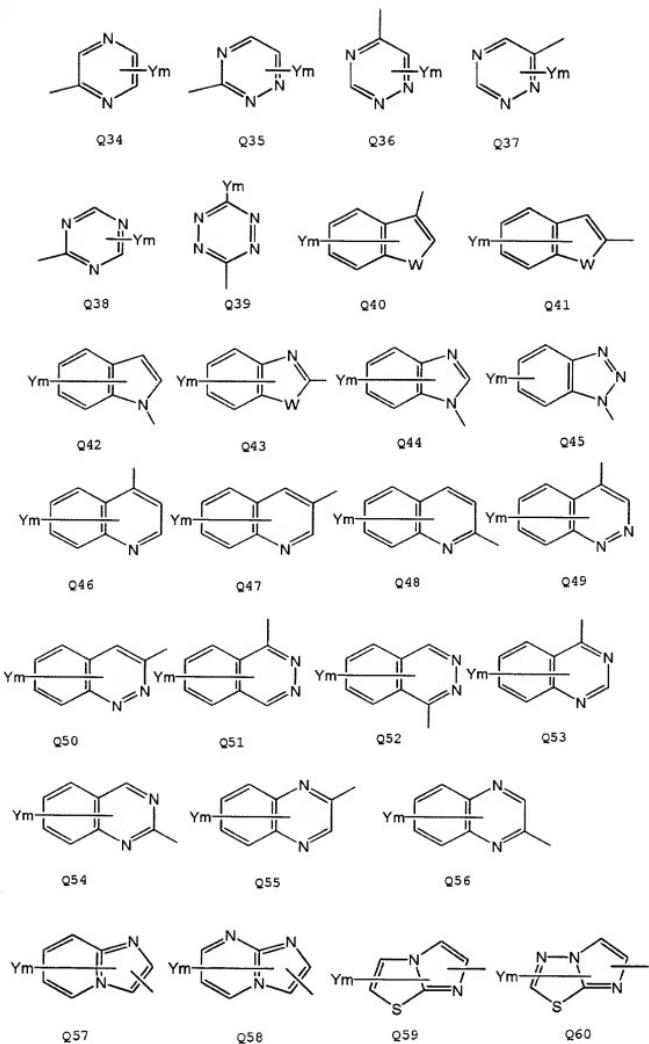
n represents an integer of 0 to 4; further, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring (as used herein, the term fused ring means naphthalene,

tetrahydronaphthalene, indene, indane, quinoline, quinazoline, chroman, isochroman, indole, indoline, benzodioxane, benzodioxole, benzofuran, dihydrobenzofuran, benzothiophene, dihydrobenzothiophene, benzoxazole, benzothiazole, benzimidazole or indazole), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group,

C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group;

Q represents an N-, S- or O-containing, optionally substituted, heterocyclic group or fused heterocyclic group, selected from the group consisting of the following formulas Q1 to Q60;





(in these formulas, Y, which may be same or different, represents halogen atom, cyano group, nitro group, halo C₃-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A²-R⁷ (in this formula, A² and R⁷ are as defined above); m represents an integer of 0 to 6; R¹³ in the formula Q22 and Q23 represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ alkynyl group, halo C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy C₁-C₆ alkyl group, halo C₁-C₆ alkoxy C₁-C₆ alkyl group, C₁-C₆ alkylthio C₁-C₆ alkyl group, halo C₁-C₆ alkylthio C₁-C₆ alkyl

group, C_1-C_6 alkylsulfinyl C_1-C_6 alkyl group, halo C_1-C_6 alkylsulfinyl C_1-C_6 alkyl group, C_1-C_6 alkylsulfonyl C_1-C_6 alkyl group, halo C_1-C_6 alkylsulfonyl C_1-C_6 alkyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkyl-carbonyl group, C_1-C_6 alkoxy carbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenyl carbonyl group, or substituted phenyl-carbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6

alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group); alternatively, Y may be taken conjointly with adjacent carbon atom on the ring to form a fused ring (the fused ring is as defined above), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group;

W represents O, S or N-R¹³ (in this formula, R¹³ is as defined above); and Z¹ and Z² represent oxygen atom or sulfur atom.

6. An agrihorticultural insecticide according to Claim 5, wherein R¹, R² and R³, which may be same or different, represent hydrogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group or -A¹ -(G)_r (in this formula, A¹ represents C₁-C₈ alkylene group, C₃-C₆ alkenylene group or C₃-C₆ alkynylene group; G, which may be same or different, represents hydrogen atom, halogen atom, cyano group, nitro group, halo C₁-C₆ alkyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy carbonyl group, di(C₁-C₆) alkoxyphosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, di(C₁-C₆) alkoxythiophosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, diphenylphosphino group, diphenylphosphono group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkyl-sulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (as used herein, the term "heterocyclic group" means pyridyl group, pyridine-N-oxide group, pyrimidinyl group, furyl group, tetrahydrofuryl group, thieryl group, tetra-

hydrothienyl group, tetrahydropyranyl group, oxazolyl group, isoxazolyl group, oxadiazolyl group, thiazolyl group, isothiazolyl group, thiadiazolyl group, imidazolyl group, triazolyl group or pyrazolyl group), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -Z³-R⁴ (in this formula, Z³ represents -O-, -S-, -SO-, -SO₂-, -N(R⁵)- (in this formula, R⁵ represents hydrogen atom, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxycarbonyl group, phenylcarbonyl group, substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkoxycarbonyl group, substituted phenyl C₁-C₄ alkoxycarbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy

group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, C_1-C_6 alkylsulfonyl group or halo C_1-C_6 alkylsulfonyl group), $-C(=O)-$ or $-C(=NOR^6)-$ (in this formula, R^6 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, phenyl C_1-C_4 alkyl group, or substituted phenyl C_1-C_4 alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group), and R^4 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 alkynyl group, halo C_3-C_6 alkynyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy C_1-C_6 alkyl group, C_1-C_6 alkylthio C_1-C_6 alkyl group, formyl group, C_1-C_6 alkylcarbonyl group, halo C_1-C_6 alkylcarbonyl group, C_1-C_6 alkoxycarbonyl group, mono (C_1-C_6) alkylaminocarbonyl group, di(C_1-C_6) alkylaminocarbonyl group in which the (C_1-C_6) alkyl groups may be same or different, mono(C_1-C_6) alkylaminothiocarbonyl group, di(C_1-C_6) alkylaminothiocarbonyl group

in which the (C_1-C_6) alkyl groups may be same or different, di(C_1-C_6) alkoxyphosphoryl group in which the (C_1-C_6) alkoxy groups may be same or different, di(C_1-C_6) alkoxythiophosphoryl group in which the (C_1-C_6) alkoxy groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenyl C_1-C_4 alkyl group, substituted phenyl (C_1-C_4) alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group,

halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group); and r represents an integer of 1 to 4); further, R^1 and R^2 may be taken conjointly to form 4- to 7-membered rings which may be intercepted by 1 to 3, same or different oxygen atom, sulfur atom or nitrogen atom;

X , which may be same or different, represents halogen atom, cyano group, nitro group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^2-R^7$ [in this formula, A^2 represents $-O-$, $-S-$, $-SO-$, $-SO_2-$, $-NR^3-$ (in this formula R^8 represents hydrogen atom, C_1-C_6 alkyl-

carbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, phenyl carbonyl group, substituted phenyl carbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkoxy carbonyl group or substituted phenyl C₁-C₄ alkoxy carbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group), -C(=O)-, -C(=NOR⁶)- (in this formula, R⁶ is as defined above), C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₂-C₆ alkenylene group, halo C₂-C₆ alkenylene group, C₂-C₆ alkynylene group or halo C₃-C₆ alkynylene group; and

- (1) in cases where A² represents -O-, -S-, -SO-, -SO₂- or -NR⁸- (in this formula, R⁸ is as defined above), R⁷ represents hydrogen atom, halo C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkenyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of

halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^3-R^9$ (in this formula, A^3 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_3-C_6 alkenylene group, halo C_3-C_6 alkenylene group, C_3-C_6 alkynylene group or halo C_3-C_6 alkynylene group; and R^9 represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxycarbonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or

$-A^4-R^{10}$ (in this formula, A^4 represents $-O-$, $-S-$, $-SO-$, $-SO_2-$ or $-C(=O)-$; and R^{10} represents C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 alkenyl group, halo C_3-C_6 alkenyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group));

(2) in cases where A^2 represents $-C(=O)-$ or $-C(=NOR^6)-$ (in this formula, R^6 is as defined above), R^7 represents hydrogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_2-C_6 alkenyl group, halo C_2-C_6 alkenyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, C_1-C_6 alkylthio group,

mono(C₁-C₆) alkylamino group, di(C₁-C₆) alkylamino group in which the (C₁-C₆) alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenylamino group, substituted phenylamino group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group; and

(3) in cases where A^2 represents C_1-C_6 alkylene group, halo C_1-C_6 alkylene group, C_2-C_6 alkenylene group, halo C_2-C_6 alkenylene group, C_2-C_6 alkynylene group or halo C_3-C_6 alkynylene group, R^7 represents hydrogen atom, halogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy carbonyl group, tri(C_1-C_6) alkylsilyl group in which the (C_1-C_6) alkyl groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, or $-A^5-R^{11}$ (in this formula, A^5 represents $-O-$, $-S-$, $-SO-$ or $-SO_2-$; and R^{11} represents C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, phenyl group, substituted phenyl group having at least

one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A⁶-R¹² (in this formula, A⁶ represents C₁-C₆ alkylene group, halo C₁-C₆ alkylene group, C₂-C₆ alkenylene group, halo C₂-C₆ alkenylene group, C₂-C₆ alkynylene group or halo C₃-C₆ alkynylene group; and R¹² represents hydrogen atom, halogen atom, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom,

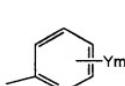
C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenoxy group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenylthio group, substituted phenylthio group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆

alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group));

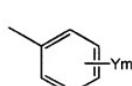
n represents an integer of 0 to 4; further, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring (as used herein, the term fused ring means naphthalene, tetrahydronaphthalene, indene, indane, quinoline, quinazoline, chroman, isochroman, indole, indoline, benzodioxane, benzodioxole, benzofuran, dihydrobenzofuran, benzothiophene, dihydrobenzothiophene, benzoxazole, benzothiazole, benzimidazole or indazole), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group

is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group;

Q is an optionally substituted, heterocyclic or fused heterocyclic group represented by one of the following formulas Q26 to Q28 and Q32 to Q34;



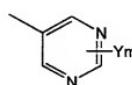
Q26



Q27



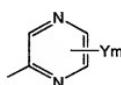
Q28



Q32



Q33



Q34

(in these formulas, Y, which may be same or different, represents halogen atom, cyano group, nitro group, halo C₁-C₆ cycloalkyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, C₁-C₆ alkyl-

sulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -A²-R⁷ (in this formula, A² and R⁷ are as defined above); m represents an integer of 0 to 4;

alternatively, Y may be taken conjointly with adjacent carbon atom on the ring to form a fused ring (the fused ring is as defined above), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio

group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group; and

Z^1 and Z^2 represent oxygen atom or sulfur atom.

7. An agrihorticultural insecticide according to Claim 6, wherein R^1 , R^2 and R^3 , which may be same or different, represent hydrogen atom, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group or $-A^1-(G)_r$ (in this formula, A^1 represents C_1-C_8 alkylene group, C_3-C_6 alkenylene group or C_3-C_6 alkynylene group; G , which may be same or different, represents hydrogen atom, halogen atom, cyano group, nitro group, halo C_1-C_6 alkyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy carbonyl group, di(C_1-C_6) alkoxyphosphoryl group in which the (C_1-C_6) alkoxy groups may be same or different, di(C_1-C_6) alkoxythiophosphoryl group in which the (C_1-C_6) alkoxy groups may be same or different,

diphenylphosphino group, diphenylphosphono group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (as used herein, the term "heterocyclic group" means pyridyl group, pyridine-N-oxide group, pyrimidinyl group, furyl group, tetrahydrofuryl group, thieryl group, tetrahydrothienyl group, tetrahydropyranyl group, oxazolyl group, isoxazolyl group, oxadiazolyl group, thiazolyl group, isothiazolyl group, thiadiazolyl group, imidazolyl group, triazolyl group or pyrazolyl group), substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, or -Z³-R⁴ (in this formula, Z³ represents -O-, -S-, -SO-, -SO₂-, -N(R⁵)- (in this formula, R⁵ represents hydrogen atom, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, phenylcarbonyl group,

substituted phenylcarbonyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkoxy carbonyl group, substituted phenyl C₁-C₄ alkoxy carbonyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, C₁-C₆ alkylsulfonyl group or halo C₁-C₆ alkylsulfonyl group), -C(=O)- or -C(=NOR⁶)- (in this formula, R⁶ represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, phenyl C₁-C₄ alkyl group, or substituted phenyl C₁-C₄ alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkyl-

sulfonyl group and halo C₁-C₆ alkylsulfonyl group), and R⁴ represents hydrogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₃-C₆ alkenyl group, halo C₃-C₆ alkenyl group, C₃-C₆ alkynyl group, halo C₃-C₆ alkynyl group, C₃-C₆ cycloalkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy C₁-C₆ alkyl group, C₁-C₆ alkylthio C₁-C₆ alkyl group, formyl group, C₁-C₆ alkylcarbonyl group, halo C₁-C₆ alkylcarbonyl group, C₁-C₆ alkoxy carbonyl group, mono(C₁-C₆) alkylaminocarbonyl group, di(C₁-C₆) alkylaminocarbonyl group in which the (C₁-C₆) alkyl groups may be same or different, mono(C₁-C₆) alkylaminothiocarbonyl group, di(C₁-C₆) alkylaminothiocarbonyl group in which the (C₁-C₆) alkyl groups may be same or different, di(C₁-C₆) alkoxyphosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, di(C₁-C₆) alkoxythiophosphoryl group in which the (C₁-C₆) alkoxy groups may be same or different, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, phenyl C₁-C₄ alkyl group, substituted phenyl (C₁-C₄) alkyl group having, on the ring thereof, at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆

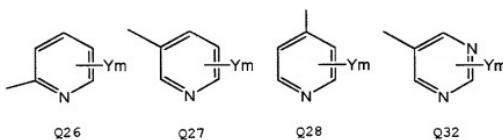
alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group); and r represents an integer of 1 to 4; further, R^1 and R^2 may be taken conjointly to form 4- to 7-membered rings which may be intercepted by 1 to 3, same or different oxygen atom, sulfur atom or nitrogen atom;

X, which may be same or different, represents halogen atom, cyano group, nitro group, amino group, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_3-C_6 cycloalkyl group, halo C_3-C_6 cycloalkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group, halo C_1-C_6 alkylsulfonyl group, mono(C_1-C_6) alkyl-amino group, di(C_1-C_6) alkylamino group in which the (C_1-C_6) alkyl groups may be same or different, C_1-C_6

alkylcarbonylamino group, halo C₁-C₆ alkylcarbonylamino group, C₁-C₆ alkoxy carbonyl group, or tri(C₁-C₆) alkyl-silylethynyl group in which the (C₁-C₆) alkyl groups may be same or different; and n represents an integer of 0 to 4; further, X may be taken conjointly with the adjacent carbon atom on the phenyl ring to form a fused ring (as used herein, the term fused ring means naphthalene, tetrahydronaphthalene, indene, indane, quinoline, quinazoline, chroman, isochroman, indole, indoline, benzodioxane, benzodioxole, benzofuran, dihydrobenzofuran, benzothiophene, dihydrobenzo-thiophene, benzoxazole, benzothiazole, benzimidazole or indazole), and said fused ring may have at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkyl-sulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substi-

tuted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group;

Q represents an optionally substituted, heterocyclic or fused heterocyclic group represented by one of the following formulas Q26, Q27, Q28 and Q32:



(in these formulas, Y, which may be same or different, represents halogen atom, cyano group, nitro group, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, halo C₃-C₆ cycloalkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, halo C₁-C₆ alkoxy halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consist-

ing of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group, phenoxy group, substituted phenoxy group having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group and halo C_1-C_6 alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), or substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C_1-C_6 alkyl group, halo C_1-C_6 alkyl group, C_1-C_6 alkoxy group, halo C_1-C_6 alkoxy group, C_1-C_6 alkylthio group, halo C_1-C_6 alkylthio group, C_1-C_6 alkylsulfinyl group, halo C_1-C_6 alkylsulfinyl group, C_1-C_6 alkylsulfonyl group and halo C_1-C_6 alkylsulfonyl group; and m represents an integer of 0 to 4;

alternatively, Y may be taken conjointly with adjacent carbon atom on the ring to form a fused ring (the fused ring is as defined above), and said fused ring may have at least one, same or different substituents selected from the group consisting of

halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group, halo C₁-C₆ alkylsulfonyl group, phenyl group, substituted phenyl group having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group, heterocyclic group (the term heterocyclic group is as defined above), and substituted heterocyclic group (the term heterocyclic group is as defined above) having at least one, same or different substituents selected from the group consisting of halogen atom, C₁-C₆ alkyl group, halo C₁-C₆ alkyl group, C₁-C₆ alkoxy group, halo C₁-C₆ alkoxy group, C₁-C₆ alkylthio group, halo C₁-C₆ alkylthio group, C₁-C₆ alkylsulfinyl group, halo C₁-C₆ alkylsulfinyl group, C₁-C₆ alkylsulfonyl group and halo C₁-C₆ alkylsulfonyl group; and

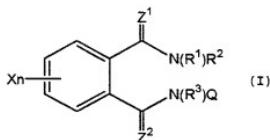
Z¹ and Z² represent oxygen atom or sulfur atom.

8. A method for using an agrohorticultural insecticide characterized by treating an objective crop or applying to soil with an effective quantity of an

agrohorticultural insecticide according to any one of
Claims 5, 6 and 7 for the purpose of controlling
noxious organisms doing harm to useful crops.

ABSTRACT

Heterocyclic amine derivatives represented by general formula (I):



wherein R¹, R² and R³ represent each H, optionally halogenated C₃₋₆ cycloalkyl, etc.; Q represents an optionally substituted heterocycle containing O, S or N; X represents halogeno, cyano, halo(C₁₋₆)alkyl, etc.; n is from 1 to 4; and Z¹ and Z² represent each O or S; and intermediates thereof represented by the following general formula (IV'): Q'-NH₂ wherein Q' represents a definite heterocycle selected from among those represented by Q. Agricultural/horticultural insecticides having a remarkable effect of controlling pest insects of crops such as rice, fruit trees and vegetables, as well as various agricultural, forestry, horticultural and stored grain pest insects.

RULE 63 (37 C.F.R. 1.63)

DECLARATION AND POWER OF ATTORNEY FOR UTILITY OR DESIGN PATENT APPLICATION IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

[] Declaration Submitted with Initial Filing or [] Declaration Submitted after Initial Filing (surcharge 37 CFR 1.16 (e) required)

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the **INVENTION ENTITLED**

"PHTHALAMIDE DERIVATIVES, INTERMEDIATES IN THE PRODUCTION THEREOF, AND
AGRICULTURAL/HORTICULTURAL INSECTICIDES AND METHOD FOR USING THE SAME" the specification of which is:

[X] ~~entitled~~ was filed on December 19, 2001, as U.S. Serial No. 10/018,464
OR

[X] was filed on (MM/DD/YYYY) July 4, 2000 As United States Application Number (Attorney Docket No. _____) or
PCT International Application No. PCT/JP00/04444 and was amended on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56 including for continuation-in-part application, material information which becomes available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International Application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventors certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)

Number	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?
11/190746	Japan	July 5, 1999	[]	Yes [] No []
20/00-080991	Japan	March 22, 2000	[]	Yes [] No []

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional Application(s) listed below.

PRIOR U.S. PROVISIONAL(S)

Application No. (series code/serial no.) Filing Date (MM/DD/YYYY)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint the registered practitioners represented by Customer No.: 20736 to prosecute this application and transact all business in the U.S. Patent and Trademark Office in connection therewith. Direct all correspondence to **Mantelli Denison & Selter PLLC** at Customer No.: 20736.

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MDS Jan 2001

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